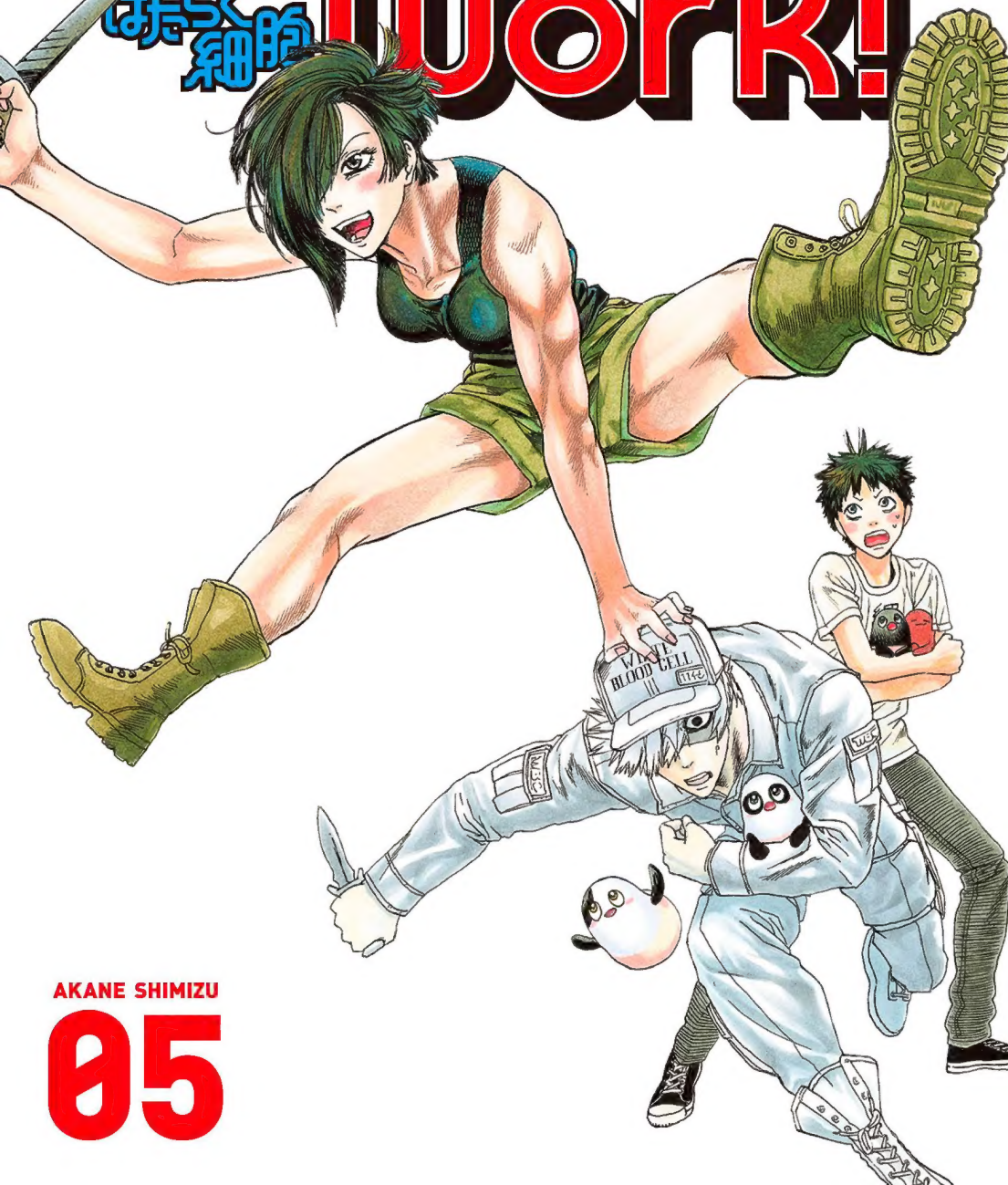


# Cells at Work!

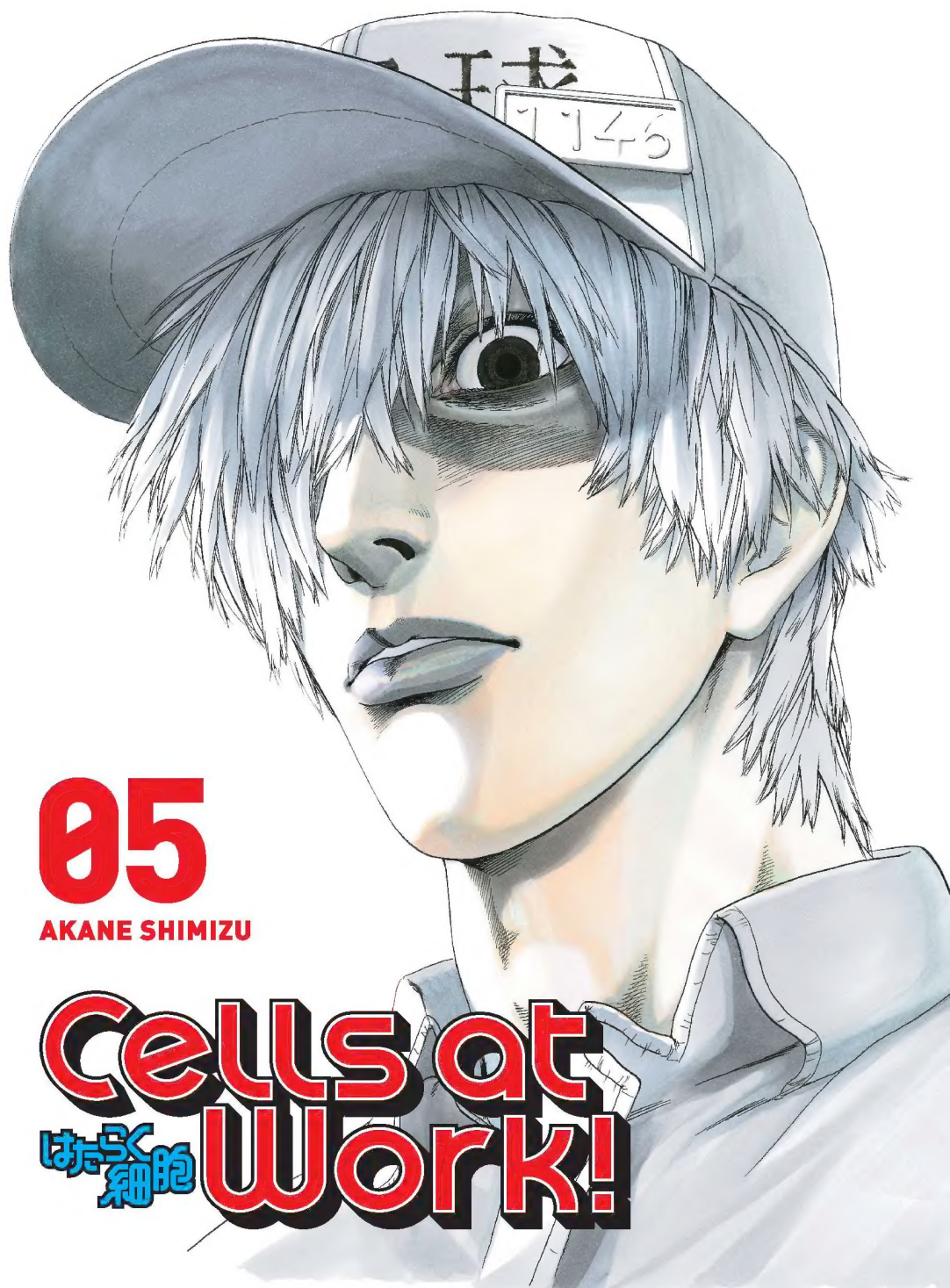
はたらく細胞



AKANE SHIMIZU

05





05

AKANE SHIMIZU

Cells at  
はたらく細胞 Work!



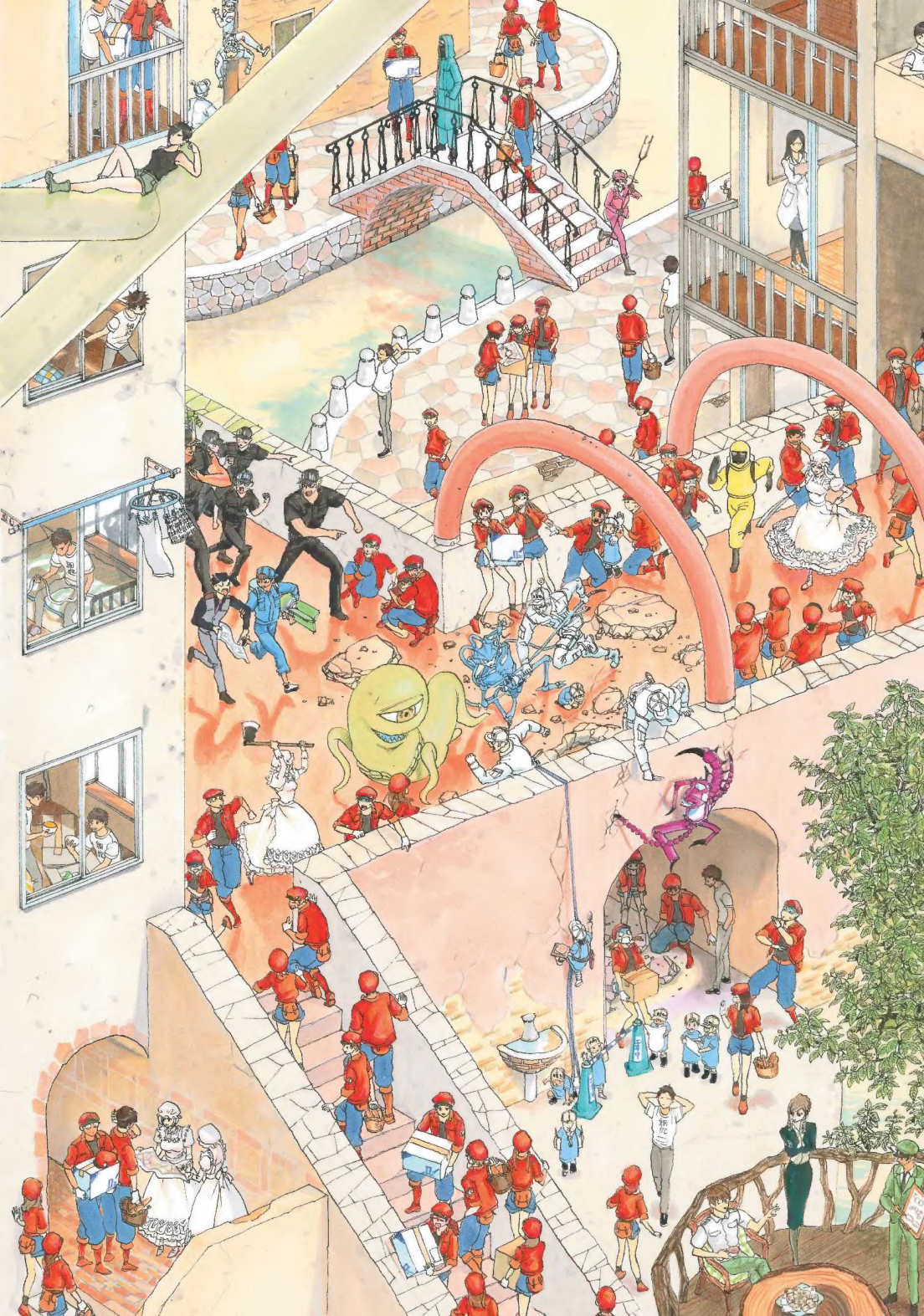
# CONTENTS

|            |                                 |     |
|------------|---------------------------------|-----|
| Chapter 20 | <b><i>H. Pylori</i></b>         | 003 |
| Chapter 21 | <b>Antigenic Shift</b>          | 045 |
| Chapter 22 | <b>Cytokines</b>                | 075 |
| Chapter 23 | <b>Harmful Bacteria</b>         | 107 |
| Chapter 24 | <b>Cancer Cell II (Part I)</b>  | 141 |
| Chapter 25 | <b>Cancer Cell II (Part II)</b> | 175 |











**WE'VE GOT  
A SITUATION  
NEAR THE  
PHARYNX!**



**VIRUS-  
INFECTED  
CELLS!**



**IMMUNE  
CELLS ARE  
TO DEPLOY  
IMMEDIATELY  
TO THE  
SITE!**

**CHAPTER 20: H. PYLORI**





AND IT'S  
THE SAME  
STORY  
ALL OVER  
AGAIN....



...BEAT  
ALL THE  
INFECTED  
BAD  
GUYS...

THE  
IMMUNE CELLS  
RUSH TO THE  
SCENE...

HEY, I TOLD  
YOU NOT TO  
FRATERNIZE!!  
IGNORE HIM!!

HEY, I  
KNOW  
THAT  
CELL...

SO TODAY,  
LIKE EVERY  
OTHER  
DAY...

...AND  
RESTORE  
PEACE  
TO THE  
TOWN...



...ORDINARY  
CELLS LIKE  
US DON'T  
GET TO DO  
A THING.



SOOO  
BORING...

EVEN  
RHINOVIRUS IS  
GONE.

SIGH, NOW  
THAT MY  
COPY'S LIVING  
ON HIS OWN,  
I'VE GOT  
NO BUDDIES  
AROUND.



THEY'RE JUST  
KILLERS, BUT  
THEY ACT LIKE  
SUPERHEROES!

#!! P T P P P  
W H O O O S H

OUT OF  
SERVICE

WHO  
DO THOSE  
IMMUNE  
CELLS THINK  
THEY ARE,  
ANYWAY?

JUST  
ONE  
TIME!



SHOOT...  
JUST ONCE,  
I'D LIKE  
TO HELP  
SOMEONE  
SO THEY'D  
BE ALL!

THANK  
YOU  
FOR  
SAVING  
ME!

AND WHEN WE GET  
ATTACKED BY VIRUSES, THEY  
SCOLD US FOR NOT DEFENDING  
OURSELVES PROPERLY AND  
NOT BEING AWARE OF THE  
DANGERS.

I'M GETTING  
ANGRY JUST  
REMEMBERING.

#!!  
BUSTLE

ONLY IF  
I WERE  
STRONGER



#!!  
BUSTLE

CELL

#!!  
P T P P P  
W H O O O S H

SHEESH!  
ORDINARY  
CELLS LIKE US  
HAVE LIVES  
AND FEELINGS,  
TOO!

BUT  
THEY  
DON'T  
CARE!

...HUH?

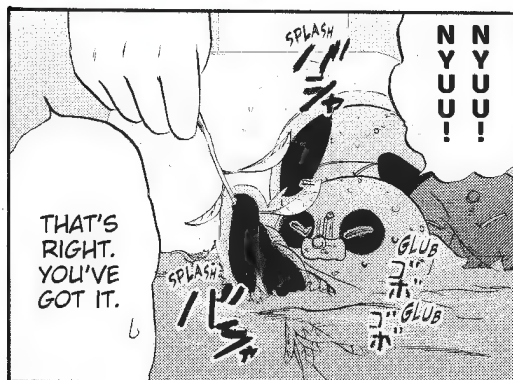
NYUUU!

SPLASH

SPLASH





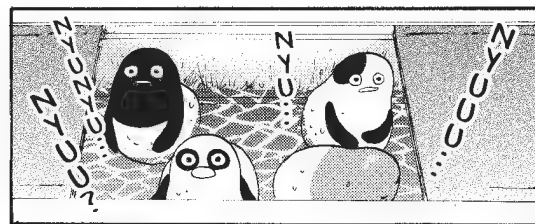




NYUUUUU!!









...I BROUGHT  
THEM HOME  
WITH ME...



...



DING  
DONG

THEY  
COULD  
EVEN  
KILL ME,  
TOO...



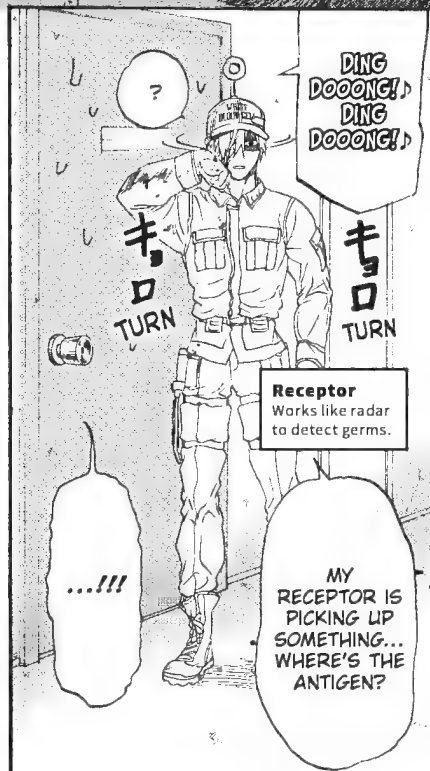
AHHHH! THIS IS  
VERY BAD!!! I'LL  
GET IN TROUBLE  
FOR SURE!! AND  
I DID SOMETHING  
LIKE THIS  
BEFORE!

IT'S MY  
SECOND  
OFFENSE!  
I'M A REPEAT  
OFFENDER.  
NOOOOOO!



**White Blood Cell (Neutrophil)**

His main job is to destroy foreign substances that enter the body from the outside, such as bacteria and viruses.



**Receptor**

Works like radar to detect germs.



HE'S BEING HELD  
BEHIND THE DOOR BY  
THE ANTIGEN...  
AND HE CAN'T CALL  
FOR HELP, SO HE MADE  
THAT NOISE OUT OF  
DESPERATION...?!

OH!

KNOCK  
KNOCK  
7.

CALL  
FOR HELP  
AND I'LL  
KILL YOU!

NYU...

NYUUUU...

WAIT...  
MAYBE—

WAS HE  
TALKING IN  
HIS SLEEP  
OR SOME-  
THING?

...NO  
REPLY?

WHATEVER.  
I HAVE TO  
FIND THE  
ANTIGEN...

PARDON  
ME, BUT IS  
EVERYTHING  
ALL RIGHT?

HEY  
THERE,  
CELL  
BOY  
...?

I'M GOING  
TO RETURN  
THESE  
WHERE  
I FOUND  
THEM...

IT GOT  
QUIET...  
DID HE GO?  
GOOD.

THERE'S  
AN  
ANTIGEN  
NEARBY...

HEY CELL  
BOY, ARE  
YOU ALL  
RIGHT?!





#! ZSH

I UNDERSTAND HOW YOU FEEL...

BUT I CAN'T STAND BY AND WATCH AS GERMS MULTIPLY INSIDE THE BODY.

AH!

WHAT, ARE YOU HUNGRY? I DON'T HAVE ANYTHING FOR YOU.

NYUU! NYU!♡

TEP

HMM ...?

THEY WARMED UP TO ME AFTER I SAVED THEM... AND I COULDN'T JUST LEAVE THEM WHEN I THOUGHT ABOUT THEM BEING KILLED...

S... SO THAT'S WHAT HAPPENED.

FALTER  
FALTER  
FALTER

...I SEE.

CELL BOY...

I DON'T HAVE ANY-THING, SEE!

NYU! NYU!♡

IN SOME CASES, THEY CAN DESTROY RED BLOOD CELLS IN A PROCESS CALLED HEMOLYSIS, AND ROB US OF OUR NUTRIENTS. ...DO YOU UNDERSTAND?

ONCE THEY MULTIPLY, GERMS RELEASE TOXINS AND HARM THE CELLS INSIDE THE BODY.

NYUUU~

NYU?  
NYU  
NYU?  
NYU  
NYUU  
NYUU  
?!  
...

STEP

THANK YOU FOR HELPING TO APPREHEND THE ANTIGENS.

IT WOULD BE CRUEL TO KILL THEM IN FRONT OF HIM...





HM?

HEY 1140,  
ARE YOU  
THERE?



CELL BOY,  
I'M TAKING  
THESE  
GERMS  
WITH ME.

GOT IT!  
I'LL BE  
RIGHT  
THERE.

THIS IS 4989.  
A GERM IN THE  
STOMACH IS  
PUTTING UP A  
TOUGH FIGHT!

CAN  
YOU GET  
THROUGH  
THE  
ESOPHAGUS  
AND  
HELP?!



SQUEEZE

BUT  
THOSE  
GUYS...

...CAN'T  
PROTECT  
ANYTHING...  
AND IT'S OUR  
LOT TO DIE A  
MEANINGLESS  
DEATH  
SOMEDAY...

REGULAR  
CELLS  
LIKE ME...



R-RIGHT...  
THAT'S  
HIS JOB...

IT'S THE  
IMMUNE  
CELLS' JOB  
TO PROTECT  
THE REST  
OF US...



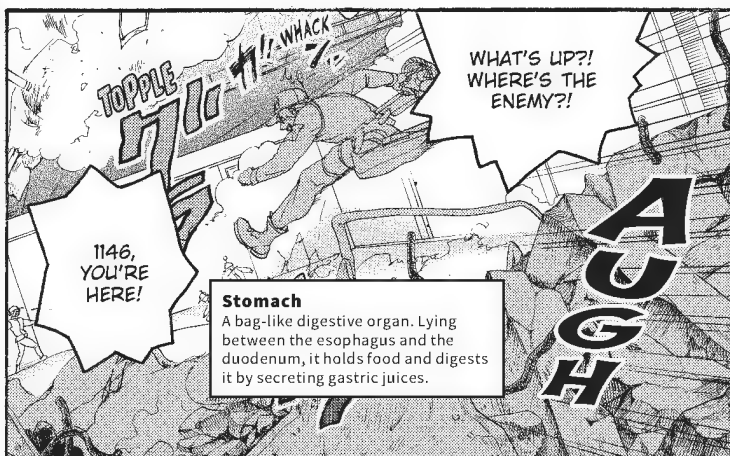
PYLORI!!!

PSHH

HH H



OVER  
THERE...  
BEYOND  
THE  
STOMACH  
LINING!!



1146,  
YOU'RE  
HERE!

#### Stomach

A bag-like digestive organ. Lying between the esophagus and the duodenum, it holds food and digests it by secreting gastric juices.

WHAT'S UP?!  
WHERE'S THE  
ENEMY?!

AUGH

THAT'S  
RIGHT!  
ABANDON  
HOPE!!

HA  
HA  
HA  
HA  
HA!

PYLO  
PYLO  
PYLO  
PYLO

THERE'S  
NOTHING  
YOU CELLS  
CAN DO TO  
STOP ME!

WE H. PYLORI  
HAVE HARDY  
BODIES THAT  
ALLOW US TO  
OPERATE INSIDE  
GASTRIC ACID!  
UNLIKE YOU  
WEAKLINGS!!

**H. Pylori**

Helicobacter pylori. Resistant to gastric acid, they cause inflammation and ulcers, and on occasion, stomach cancer. Bacteria harmful to the human body.

THIS  
ISN'T  
GOOD...

H.  
PYLORI...

AAUGH

RUMBLE

ト  
ト  
ト



**BOOM**

**WHAT?!**

**I'LL DEAL A FATAL BLOW BEFORE I GET DISSOLVED!**

**I'LL GO.**

**B-BUT... WE CAN'T GET TO HIM. WE'LL BE DISSOLVED BY GASTRIC ACID!**

**WE CAN'T JUST LET IT WREAK HAVOC! IT'LL WRECK THE GASTRIC MUCOSA!**

**WHOAAA... THIS LOOKS LIKE TROUBLE.**

**SO THIS IS THE FRONT LINE.**

**TOPPLE**

**P-LSHT**

**BOOM**

**I HAVE NO CHOICE!  
IT'S FOR THE BODY!!**

**BUT 1146,  
YOU'LL DIE IF YOU DO THAT!**

**BOOM**

AN ORDINARY  
CELL LIKE ME...

...COULD NEVER  
DO THAT...

FOR THE BODY...  
TH-THAT'S RIGHT...  
IT'S FOR THE BODY...  
DYING FOR  
SOMEONE ELSE...  
THAT'S AMAZING...



WERLESS...



**THIS  
BODY IS  
OURS  
NOW!**

IT'S  
MADE  
OF  
ACID-  
RESIS-  
TANT  
ENAM-  
EL

AT  
LEAST  
WEAR  
THIS!

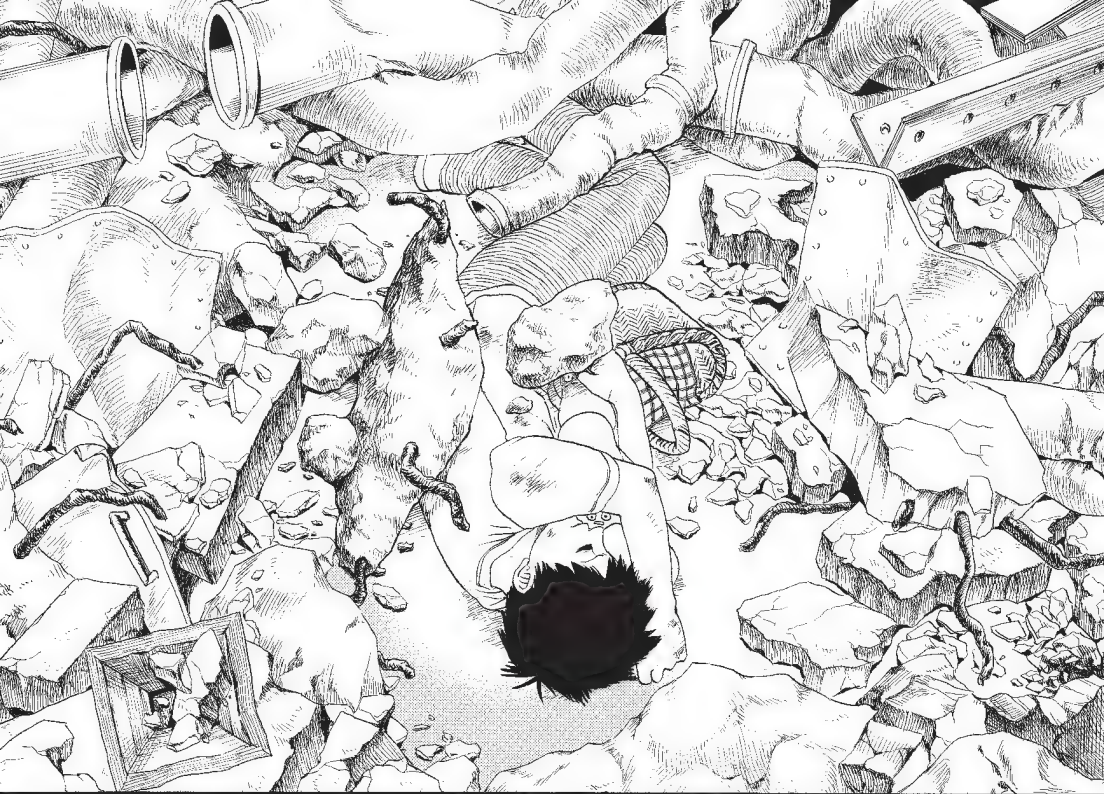
**CRASH**

**IT'S  
BREAK-  
ING  
DOWN!**

**OH NO!  
THE  
STOMACH  
LINING...**







**C-CELL  
BOY?!**







I CAN'T...  
PROTECT  
YOU.

HA...  
HA HA.

SORRY  
GUYS. I'M  
JUST A  
REGULAR  
CELL.



BUT JUST  
REMEMBER...  
THAT THERE  
WAS AT LEAST  
ONE GUY WHO  
THOUGHT THE  
WAY I DID...

BUT...  
I WANTED  
TO HELP  
YOU IF I  
COULD...

AS LONG AS  
YOU'RE IN THIS  
BODY, GERMS  
LIKE YOU ARE  
GONNA BE  
KILLED...



...TO YOUR  
FRIENDS...

WHAT  
I REALLY  
WANTED...  
WAS TO  
BRING YOU  
HOME...



ARE  
YOU ALL  
RIGHT?!

HA  
HA HA...  
NOW ISN'T  
THAT  
SOMETHING.

A CELL  
SAVING A  
GERM.



HUH...  
YOU...

I COULD  
SWEAR I'VE  
SEEN YOU  
SOMEWHERE  
BEFORE...



I'LL  
ANNIHILATE  
YOU ALL.

FWIP!!

NO  
MATTER.

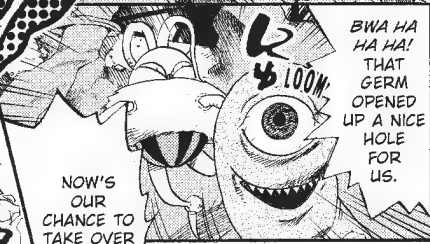
TAKE  
THIS!

RU

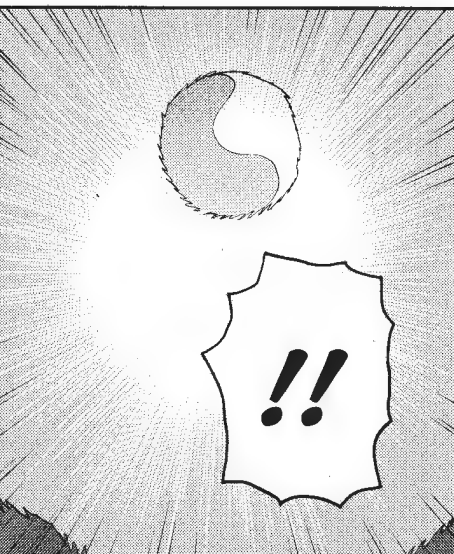
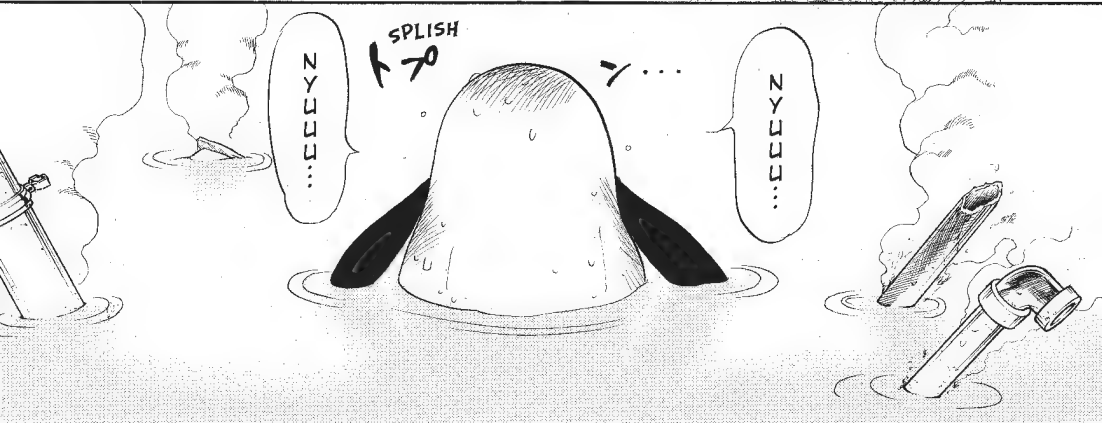
SH

A FLOOD  
OF  
GASTRIC  
ACID!!

OH  
NO!













THAT  
GERM'S  
ATTACK  
WORKED  
ON THE  
PYLORI?!

WHOA!

WH-  
WHAT  
HAPPENED  
?!



GASP!

A-ARE  
YOU...

PYLO

HOW DID  
YOU HURT  
ME...?

PYLO



NYUUUUU!

A LACTIC  
ACID  
BACTERIUM  
?!

### Lactic Acid Bacteria

A name not for a specific bacterial species, but a blanket term for bacteria that produce lactic acid in the course of breaking down sugars to live. The "nyuu" sound it makes in this comic comes from the Japanese term for lactic acid bacteria, "nyuusankin."

GAAAAH!  
NO MORE!



NYU NYU  
NYU NYU  
NYU NYU  
NYU NYU  
NYU NYU  
NYU NYU  
NYU NYU  
NYU NYU  
NYU NYU  
NYU NYU



OH  
NO!

ドドドドド  
RRRUMBLE

GUH...  
I CAN'T  
TAKE ANY  
MORE...

I HAVE  
NO CHOICE  
BUT TO  
RETREAT...

### Lactic Acid Production

Lactic acid is a metabolic byproduct of lactic acid bacteria. Because some bacteria are weak against lactic acid, it can kill them or slow their reproduction.

LEAD

...FROM  
THAT  
SEA OF  
ACID.

YOU  
FINALLY  
CAME  
OUT...

NYUU!

OH SHOOT,  
OH SHOOT,  
OH—



DIE, YOU  
"PYLO"-ING  
SCUM!


SLASH

PYLOR!!!









GERMS  
THAT  
WORK  
FOR THE  
BODY.

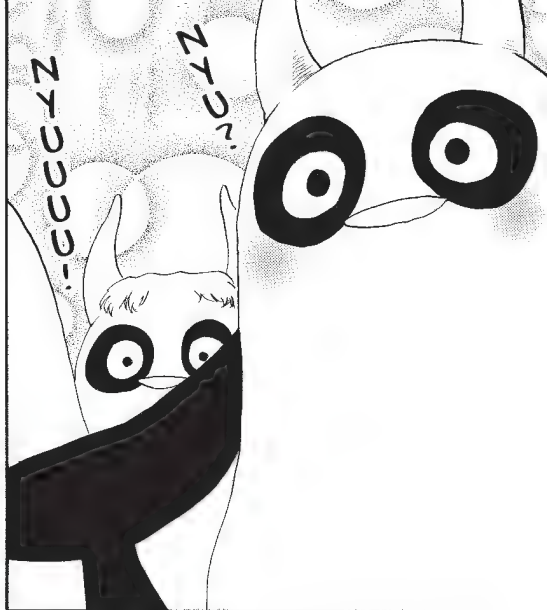
**Good Bacteria**

A blanket term for bacteria that live in the digestive system and are beneficial to the human body. Lactic acid bacteria and bifidobacteria are the most well-known. Some lactic acid bacteria are resistant to gastric acid and can suppress the activity of *H. pylori*.





**THEY'RE  
GOOD  
BACTERIA.**



I DIDN'T  
REALIZE WHAT  
THEY WERE  
BECAUSE I'VE  
NEVER SEEN  
THEM IN THEIR  
INACTIVE  
FORM.

THEY MUST  
HAVE COME INTO  
THE BODY WITH  
SOME FOOD OR  
SOMETHING.

B-BUT  
WHAT  
ABOUT  
THESE  
GUYS?

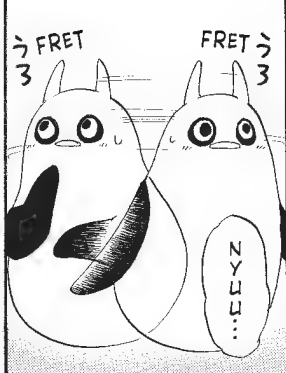
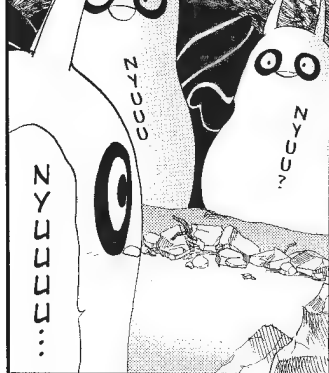
OTHER  
GERMS  
MIGHT COME  
IN THROUGH  
THAT HOLE  
THE PYLORI  
OPENED.

...WELL,  
I BETTER  
GET BACK  
TO PATROL  
DUTY.

HUH?









...AND THEY  
WORK WITH  
THEIR FRIENDS  
IN VARIOUS  
DIGESTIVE  
ORGANS.

BUT THERE  
ARE SEVERAL  
KINDS OF  
LACTIC ACID  
BACTERIA...

NYUU!

BY  
THE WAY,  
CELL BOY...  
THIS MAY  
OR MAY NOT  
CONCERN  
YOU...

HMM?

YEAH!

NYUU!

...

NYUU!

WANT ME TO  
SHOW YOU  
AROUND?

HUH?  
UH, A  
LITTLE.  
AH HA  
HA HA.

NYUU

NYUU

BY  
THE WAY...  
HAVE YOU  
GAINED SOME  
WEIGHT  
SINCE THE  
LAST TIME  
WE MET?

HEH  
HEH...



...HEH...

BUT THOSE  
ARE PLACES  
OF CHAOS  
THAT TOUCH  
THE OUTSIDE  
WORLD...  
TEEMING WITH  
BACTERIA  
AND VIRUSES...  
HEH HEH...

PYLOPY...

LO  
LO  
LO

PYLO LO  
O

SO YOU  
MEAN TO  
DELIVER  
THEM TO THE  
DIGESTIVE  
ORGANS  
ALIVE...

THUD  
THUD  
THUD

MAY  
YOU CELLS  
SUFFER  
AND  
REGRET...

...YOUR SELF-  
RIGHTEOUS  
HYPOCRISY...

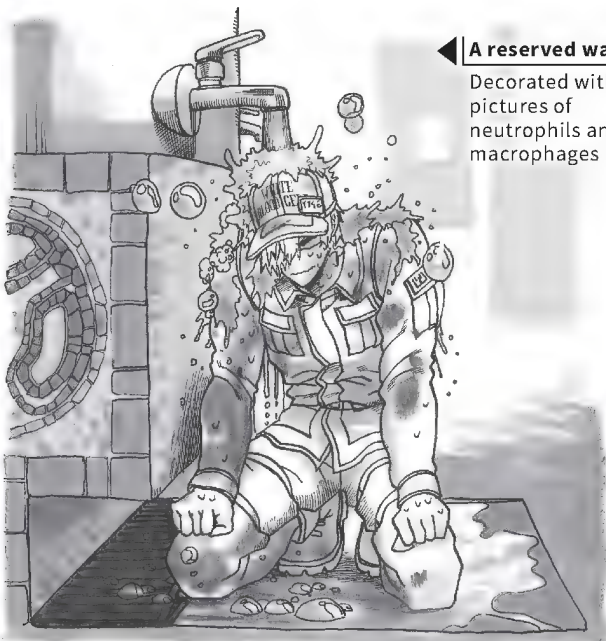
CHAPTER 20: END



# CLOTHES

## The Life and Work of White Blood Cell (Neutrophil): What He Wears

\* These are depictions created just for this comic, and differ from scientific fact.



### ◀ A reserved wash station

Decorated with  
pictures of  
neutrophils and  
macrophages

Clothes dirtied in a fight can be rinsed quickly with  
disinfectants and soap water. (No hot water. Cold.)



Can I have a  
neutrophil jacket in  
size L, please?

If they rip, new clothes can be retrieved at  
organs that work to make or store blood cells,  
like the red bone marrow, liver, or spleen.

Cells at  
Work!  
はたらく細胞

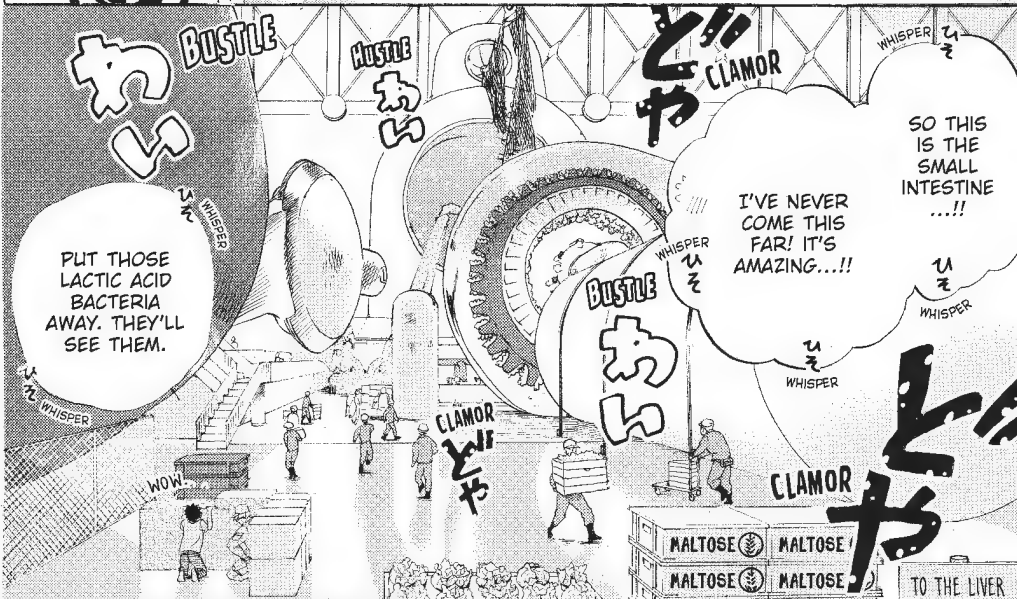






**White Blood Cell (Neutrophil)**

His main job is to destroy foreign substances that enter the body from the outside, such as bacteria and viruses.



HUH...

THOSE NETS ARE  
CALLED MICROVILLI.  
THEY INCREASE  
SURFACE AREA  
SO THE BODY CAN  
ABSORB MORE  
NUTRIENTS.

GLORP  
ゴボポポ...  
GLORP

YOU'RE  
RIGHT!  
THAT'S  
THE FOOD  
WE EAT!!

AND THEN  
THE ABSORBED  
LACTOSE,  
MALTOSE, AND  
THE REST  
GET BROKEN  
DOWN AND  
MADE INTO—  
SEE?

FOR TASTING

MOST  
OF THEM GET  
KILLED BY  
THE GASTRIC  
ACIDS.

ALTHOUGH  
I DO HEAR  
ABOUT SOME  
THAT CAUSE  
PROBLEMS...

WHOA,  
WHAT'S  
THIS?!

HUH...  
BUT DON'T  
ALL SORTS OF  
STUFF COME  
IN FROM THE  
OUTSIDE?

LIKE  
VIRUSES.

DOES BAD  
STUFF EVER  
GET ABSORBED  
BY MISTAKE?



\*NOTE: THE TERM "PURINES" RESEMBLES THE JAPANESE WORD FOR "PUDDING," HENCE THEIR PUDDING-CUP APPEARANCE HERE.



...AND THAT EXCESS URIC ACID CAN LEAD TO THE FORMATION OF SHARP, DAMAGING CRYSTALS?!

DON'T GIVE ME EXCUSES!! DON'T YOU KNOW THAT BREAKING DOWN PURINES MAKES URIC ACID...

WE ABSORBED A WHOLE PILE OF PURINES!

B-BUT WHAT CAN WE DO? WE STILL HAVE TO ABSORB THEM, EVEN WHEN THERE'S TOO MANY...

#### Purines

Indispensable material for the composition of cellular nuclei. When broken down, purines make wastes called uric acid which are excreted from the body. Excessive uric acid can build up in the body, causing gout and kidney stones.

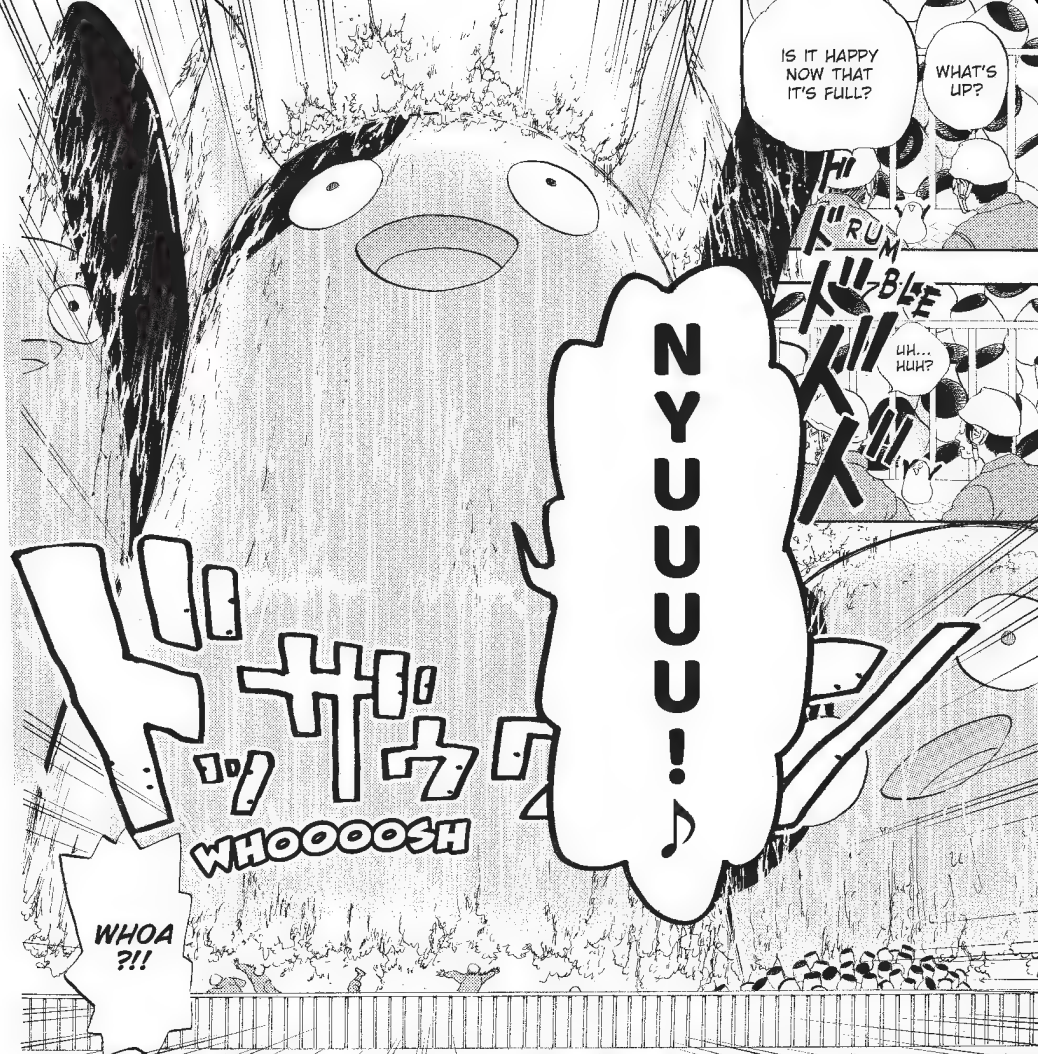


#### Lactic Acid Bacteria

Good bacteria that supports the health of the human body. They have a variety of specialties.







IS IT HAPPY  
NOW THAT  
IT'S FULL?

WHAT'S  
UP?

"RUM  
BLE

UH...  
HUH?

NYUUUU!!

WHOOOOOSH

WHOA  
?!!

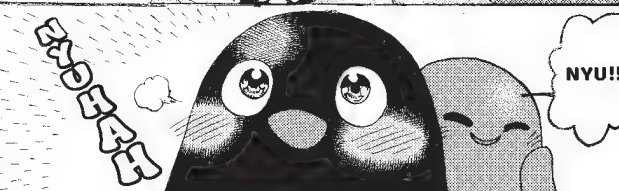
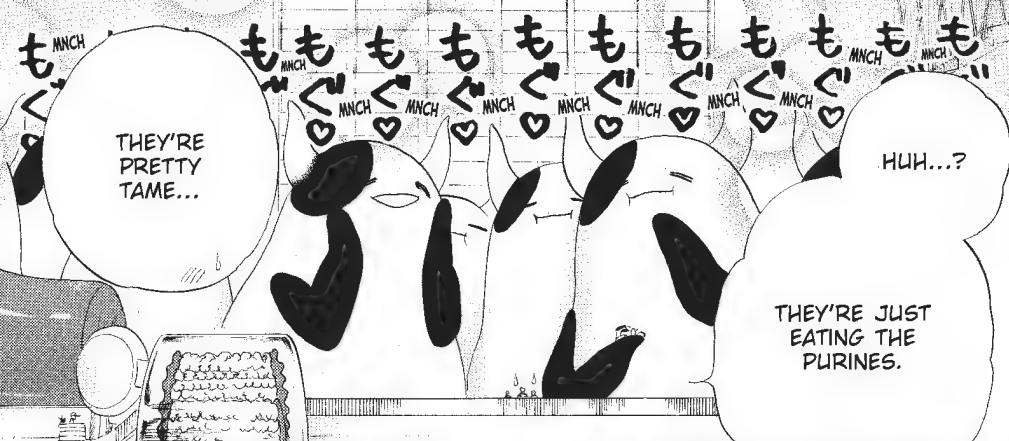


NYUUUU!♡

NYU?







**The work of lactic acid bacteria**

Some lactic acid bacteria break down purines into a form that's less absorbable by humans, and ingest it into their own bodies as nutrients.



YEAH,  
DEPENDING  
ON THE  
VARIETY, THEY  
DO DIFFERENT  
THINGS TO LIVE  
ALONGSIDE THE  
CELLS OF THE  
BODY.

THEY'RE  
AMAZING...

HUH. THEY  
CAN DO  
THINGS LIKE  
THIS, TOO!

LACTIC ACID  
BACTERIA...  
THEY CAN MAKE  
FRIENDS WITH  
ANYONE...

BYE-BYE!

NYU  
NYU!

...YEAH.

MAYBE  
THE SMALL  
INTESTINE  
WILL BE A  
COMFORTABLE  
PLACE FOR  
THAT ONE.

NYUU!

NYU?

HEEY!

...HEY!

TAKE  
CARE...

CCCC~

CCCC~



THEY'RE  
JUST  
AMAZING!

WOW!  
LACTIC ACID  
BACTERIA  
REALLY DO  
HELP THE  
BODY!



IF OTHER  
IMMUNE CELLS  
SEE THEM,  
I CAN'T...  
HM?

HEY.  
LOOK  
LOOK.

AND JUST  
SO WE'RE  
CLEAR,  
YOU CAN'T  
SHOW  
THEM TO  
ANYONE.

HUH? WHAT'RE  
YOU TALKING  
ABOUT?

IF THEY  
MAKE A  
SUSPICIOUS  
MOVE, I'LL  
HAVE TO  
DEAL WITH  
THEM  
ACCORDINGLY.

DON'T  
GET TOO  
GIDDY,  
CELL  
BOY.

EVEN  
WHEN  
THEY'RE  
HELPFUL,  
GERMS  
ARE STILL  
GERMS.



WHAT?! IS  
THERE A GERM  
NEARBY?! MY  
RECEPTOR'S  
PICKING UP  
SOMETHING!!

**Receptor**  
Works like radar  
to detect germs.

DING  
DONG

TADAAAAA!  
THIS IS A  
HANDHELD  
LACTOSE  
BACTERIUM,  
AND THIS IS A  
HEAD-MOUNTED  
LACTOSE  
BACTERIUM!

THEY'RE SO  
SQUISHY AND  
CUTE! TRY  
PETTING THEM,  
MR. WHITE  
BLOOD CELL!

!!!





GRAB

PUT THEM  
AWAY,  
STUPID!! DO  
YOU WANT  
TO GET THEM  
KILLED?!

WHOA?!  
HEY, DON'T  
GET MAD...

HI JOLT



WHAA?!

WHITE  
BLOOD CITY



SLIP  
SLIP

WHOA!

OOP!

AAH!

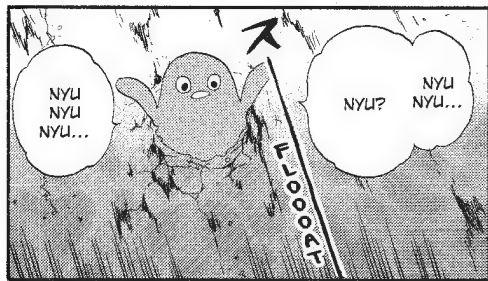
CLANG  
CLANG  
CLANG

HUUUUH?  
NOTHING HERE.  
IS MY RECEPTOR  
MALFUNCTION-  
ING...?



ホキッ  
SPLOSH

NYU!



NYU  
NYU  
NYU...

NYU?

NYU  
NYU...

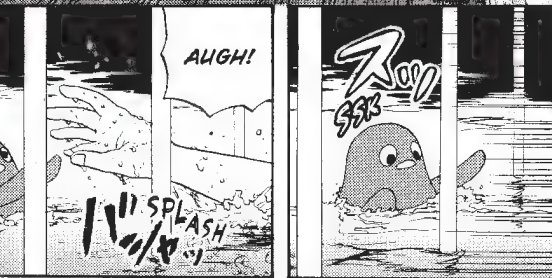
スプラッシュ



NYUUUUU!

FWOOOOSH

THE  
LACTIC ACID  
BACTERIUM  
?!



AUGH!

ZZZ

SPLASH



FWOOOSH

LACTIC ACID  
BACTERIUM!!

SPLASH

SPLASH

NYUUUUUUU...



HOLD ON!

LEAP

CELL  
BOY!!



LACTIC  
ACID  
BACTER-  
IUM!!

FWOO

OOSH

IT GOT  
WASHED  
AWAY!!

S-  
SORRY,  
BUT I  
CAN'T  
DO  
THAT!

GUH  
...?!

WHOOOSH

PANT!

PANT!

WHAT?!

I KNOW! YOU  
CAN CONTACT  
THE OTHER  
IMMUNE CELLS  
RIGHT AWAY!  
TELL THEM NOT  
TO KILL IT!

WE  
HAVE TO  
FIND IT!

WHAT DO  
WE DO...?  
IT WON'T  
MAKE IT ON  
ITS OWN.

ALL WE CAN DO  
IS HOPE THAT  
IT GETS FOUND  
BY AN IMMUNE  
CELL WHO CAN  
TELL IT'S A GOOD  
BACTERIA...

NO  
WAY  
...

BUT IF  
IT'S DEALT WITH  
AS A FOREIGN  
SUBSTANCE...  
I CAN'T STOP IT...  
I'M SORRY...

WE NEUTROPHILS  
DON'T  
HAVE ANTIGEN-  
PRESENTATION  
ABILITY.

WE CAN'T  
COMMUNICATE TO  
OTHER IMMUNE  
CELLS NOT TO  
ATTACK A GERM  
BECAUSE IT'S ONE  
OF THE GOOD  
ONES...

SPLASH

SPLASH

BUT...THE  
BODY IS SO  
LARGE. WE  
HAVE NO IDEA  
WHERE IT'LL  
END UP.

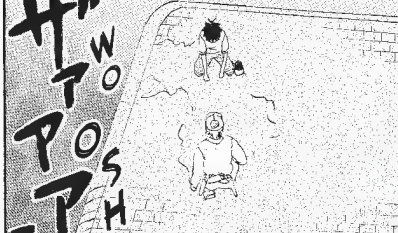




EVEN  
WHEN  
YOU  
KNOW...

YES,  
BUT...

...THAT  
IT'S NOT  
A BAD  
GERM...



...YOU  
PEOPLE  
WILL KILL  
IT LIKE  
YOU DO  
EVERY-  
THING  
ELSE.

...SO...



NYUUU?

NYUUUUU?

WHY WOULD  
YOU KILL  
SOMETHING  
LIKE THAT?!  
I HATE YOU  
IMMUNE  
CELLS!!



THAT  
BACTERIA...  
IT  
PROBABLY  
WORKED  
REALLY  
HARD  
FOR THIS  
BODY!

THAT'S  
OUR  
JOB.



THAT'S  
MY— ...BE-  
CAUSE...



...



OH!

THAT  
VOICE...



HUH?



**NK Cell (Natural Killer Cell)**

Patrols the whole body and attacks cancerous and virus-infected cells.

**NK  
CELL!**

THAT'S A  
FRUSTRATING  
THING TO  
HAVE TO  
HEAR...

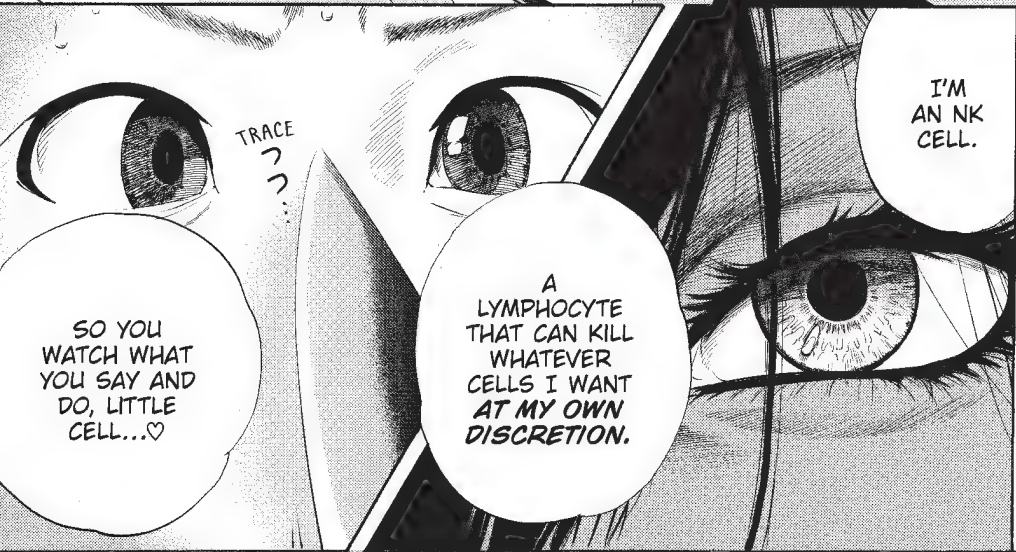
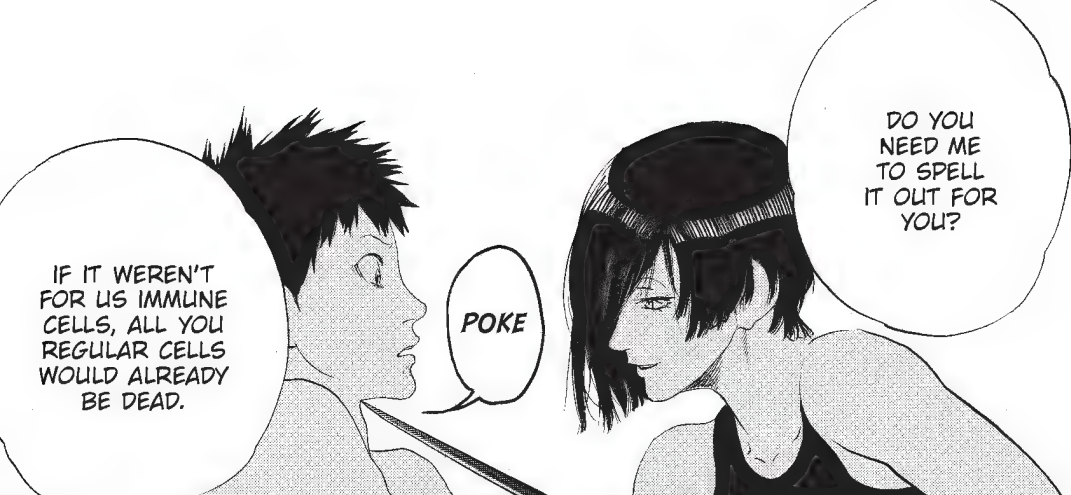
IT'S  
BEEN A  
WHILE.

UH...  
UM...

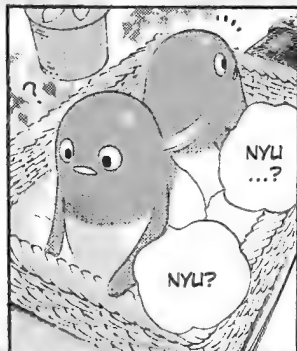
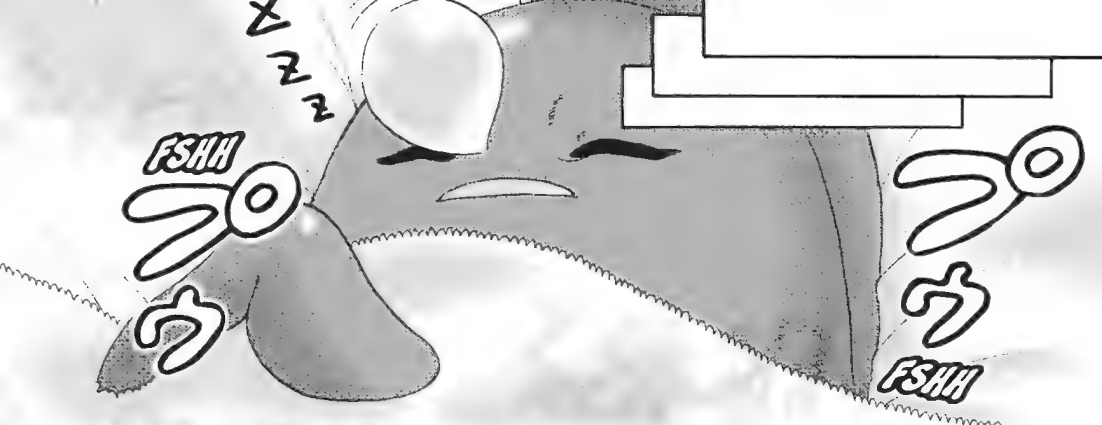
JUST  
WHEN  
I'M SO  
HARD AT  
WORK...









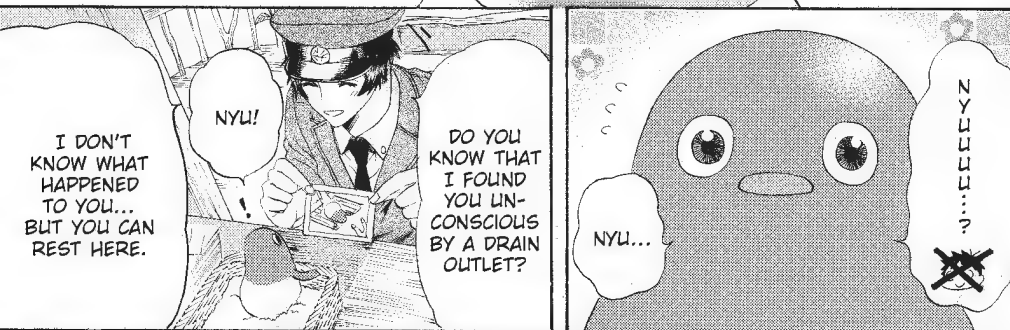




...LITTLE  
LACTIC ACID  
BACTERIUM.



SMILE



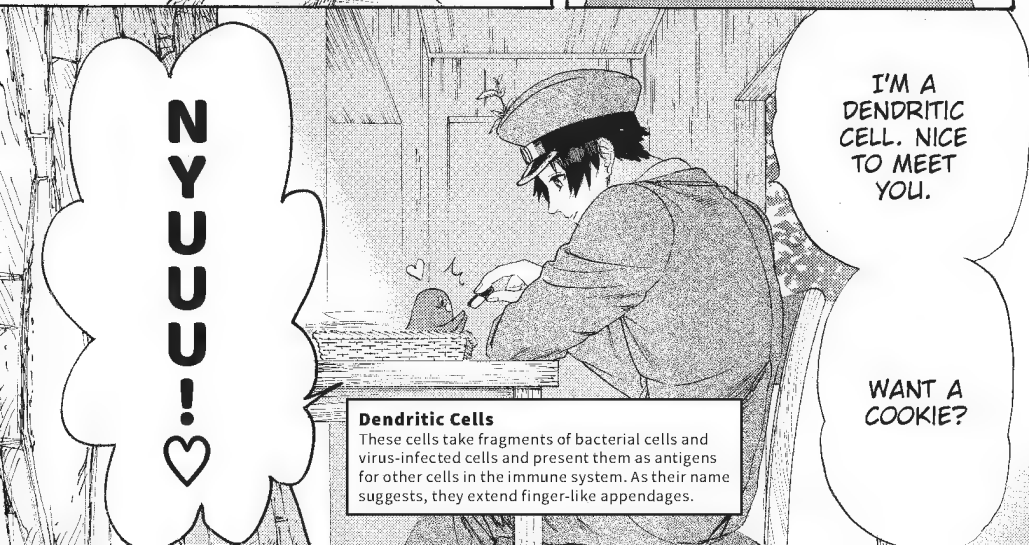
NYU!

I DON'T  
KNOW WHAT  
HAPPENED  
TO YOU...  
BUT YOU CAN  
REST HERE.

DO YOU  
KNOW THAT  
I FOUND  
YOU UN-  
CONSCIOUS  
BY A DRAIN  
OUTLET?

NYU...

NYUUUU...?



NYUU-!♡

I'M A  
DENDRITIC  
CELL. NICE  
TO MEET  
YOU.

WANT A  
COOKIE?

#### Dendritic Cells

These cells take fragments of bacterial cells and virus-infected cells and present them as antigens for other cells in the immune system. As their name suggests, they extend finger-like appendages.

...WHAT'RE  
YOU GUYS  
LOOKING  
FOR?

BY THE  
WAY...

HEY, CELL  
BOY, DON'T DO  
ANYTHING TOO  
OBVIOUS WHILE  
NK IS HANGING  
AROUND...

OH...  
NOTHING  
IMPORTANT.

RUSTLE  
コソコソ

RUSTLE  
コソコソ

BUT WE  
HAVE TO  
FIND IT AS  
SOON AS  
WE CAN!

OH? YOU  
SAY THAT,  
BUT YOU  
SEEM TO BE  
LOOKING FOR  
SOMETHING  
PRETTY  
HARD.

DING  
DONG  
DING  
DOOONG!  
♪

YOU'RE  
LOOKING  
FOR  
SOME-  
THING,  
TOO...?

AND YOU, NK?  
WHAT'RE YOU  
DOING IN A  
PLACE LIKE  
THIS?

WELL, I  
GUESS I'M  
SEARCHING,  
TOO.



THERE IS  
A RISK OF  
INFECTION.  
IMMUNE CELLS  
IN THE AREA ARE  
TO REPORT  
TO THE SITE  
IMMEDIATELY!

AN INFLUENZA  
VIRUS HAS BEEN  
DETECTED NEAR  
THE SMALL  
INTESTINE!

!

I  
FOUND  
YOU!!  
LACTIC  
ACID  
BAC—

FLONT

THAT RED  
THING...

OH...

HMPH.  
SMALL FRY.  
AT A TIME  
LIKE THIS.

NK,  
WHAT IS  
IT YOU'RE  
LOOKING  
FOR...?

### Influenza Virus

The virus responsible for the infectious disease Influenza. Largely divided into Types A, B and C, it causes symptoms such as fever above 100° F, headache, and joint and muscle pain.

**I-IT'S A  
VIRUS-  
INFECTED  
CELL!!!**

**HMPH!**



**...HAVE  
TIME TO  
WASTE  
ON YOU  
RIGHT  
NOW!**









KISHA A A H !





...SEEMS  
OFF...!!

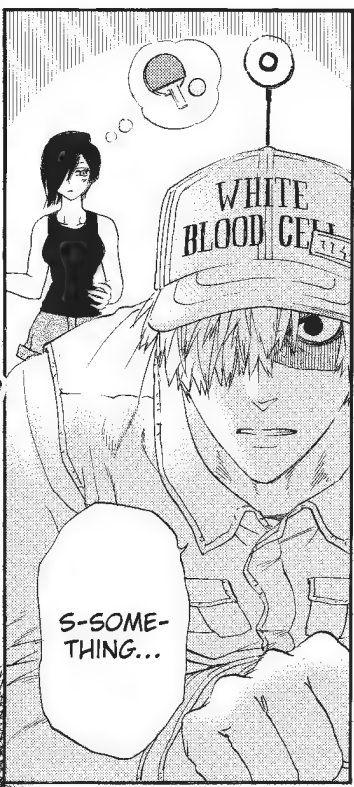
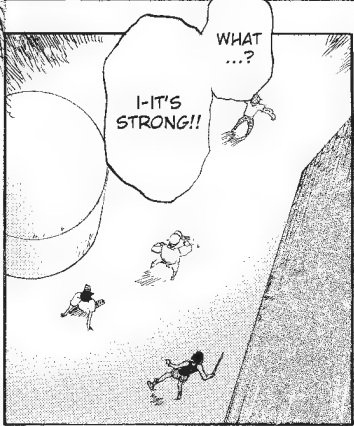
BULGE

CELL

BULGE

BULGE

SHAAAH!



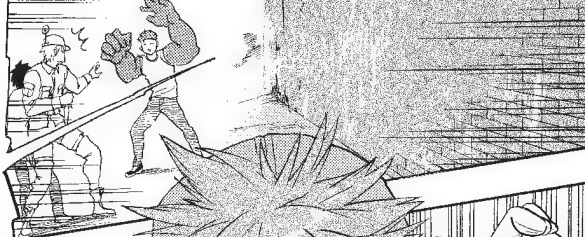
WHITE  
BLOOD CELL

S-SOME-  
THING...



AH!

YOUR  
REIN-  
FORCE-  
MENTS  
ARE  
HERE!



### Memory Cell

A lymphocyte that remembers the immune responses of antigens.

### B Cell (Antibody-producing Cell)

A type of lymphocyte that makes weapons called antibodies to fight antigens such as bacteria and viruses.

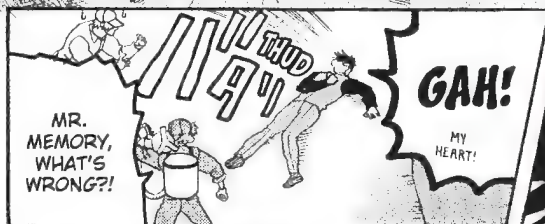
TAKE  
THIS,  
VIRUS!!

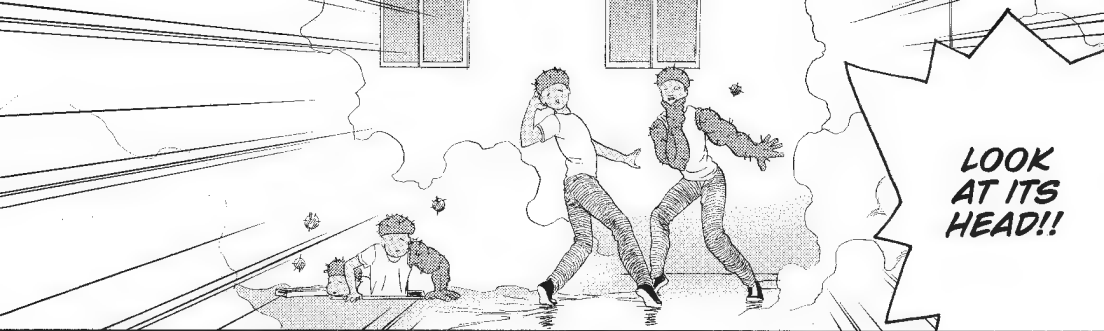
WE CAN  
BEAT ANY  
VIRUS WITH  
THESE  
ANTIBODIES!



G  
R  
A  
A  
A  
H  
!!







**LOOK  
AT ITS  
HEAD!!**



**POKE**

**SEE?!  
THAT  
SINISTER  
POINTY  
HEAD...!!**

**THE  
SHAPE  
OF THE  
VIRUS IS  
DIFFER-  
ENT!!**

**Antigen Shift in Influenza**

The influenza virus mutates easily, and the characteristics of the antigen change almost annually. Because of this, acquired immunity is sometimes insufficient to protect against it.



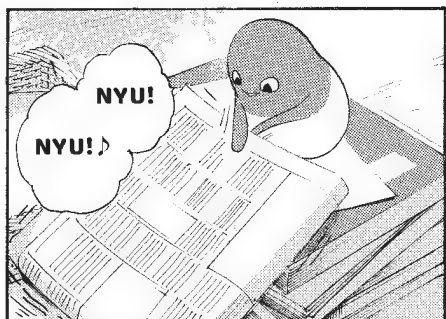
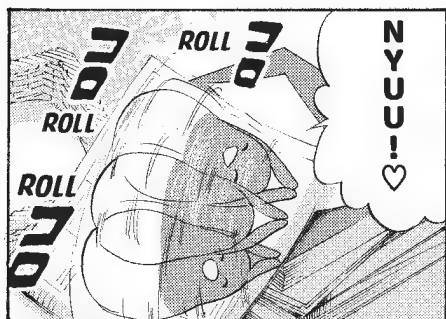
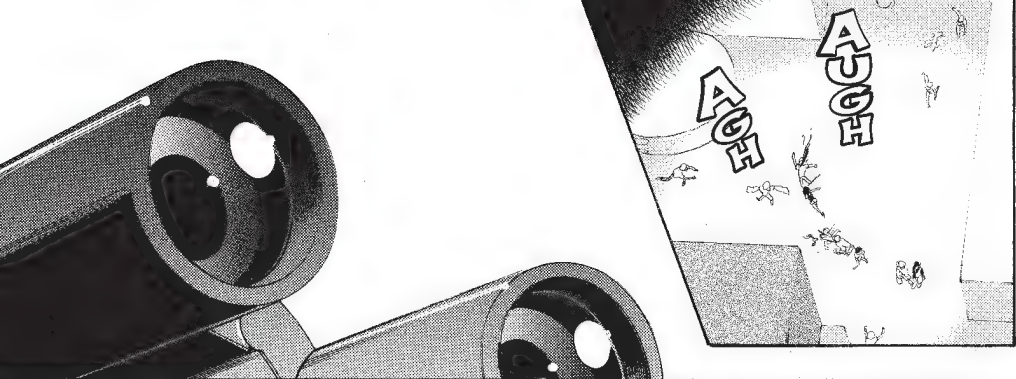
**THIS  
WORLD  
IS DONE  
FOR!!**

**FOR  
REAL  
...?**

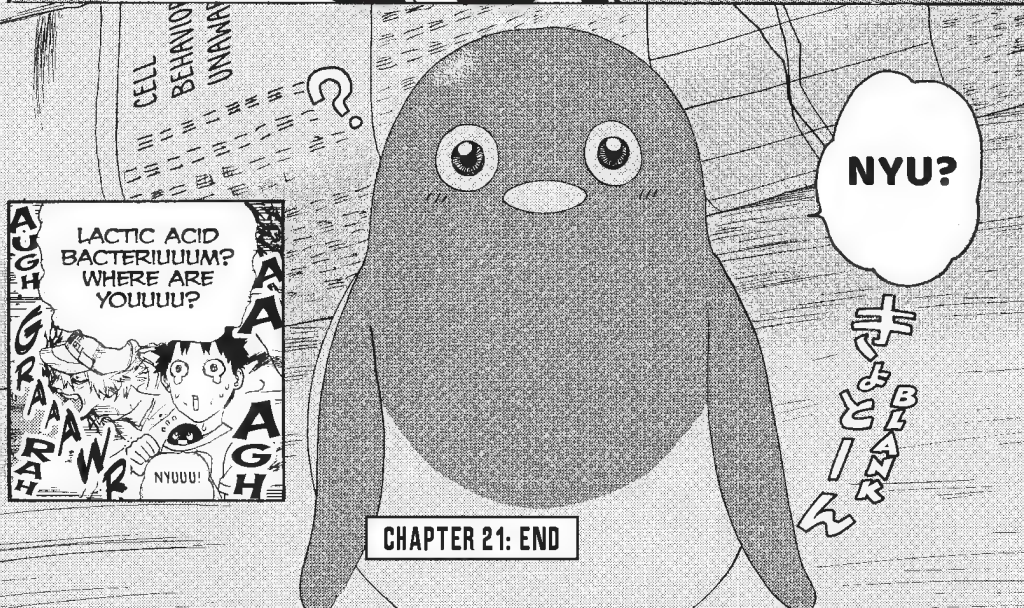
**OUR OLD  
ATTACKS  
WON'T  
WORK  
AGAINST  
THEM!**

**WHAT  
...?**









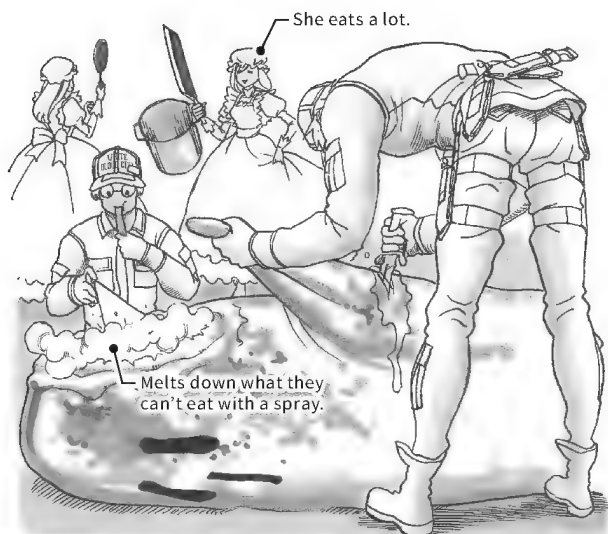


## The Life and Work of White Blood Cell (Neutrophil): What He Eats

\* These are depictions created just for this comic, and differ from scientific fact.



He eats bacteria and viruses for nutrients.



When there's more than he can eat, he gets help from the macrophages.

Cells at  
Work!  
はたらく細胞





YES...  
WE CAN FIGHT  
OLD KINDS OF  
THE VIRUS,  
BUT ANTIGEN-  
SHIFTED  
STRAINS ARE  
A DIFFERENT  
STORY!

THE BODY  
CATCHES  
INFLUENZA ONCE  
IN A WHILE,  
DOESN'T IT...?  
IS IT THAT BAD?

**White Blood Cell  
(Neutrophil)**  
His main job is to destroy  
foreign substances that enter  
the body from the outside,  
such as bacteria and viruses.



BUT  
LEAVING IT  
ALONE MIGHT  
TRIGGER A  
SURGE IN  
THE NUMBER  
OF INFECTED  
CELLS!

**Influenza Virus**  
The virus responsible for the  
infectious disease Influenza.  
The characteristics of the  
antigen change almost  
every year.

WE  
DON'T KNOW  
ANYTHING  
ABOUT THOSE.  
WE HAVE NO  
INFORMATION  
AT ALL!



WHAT  
ABOUT  
THIS?!  
TAKE  
THAT!!

ACK! I  
HAVE TO TRY  
SOMETHING,  
EVEN IF IT  
MIGHT NOT  
WORK...

**B Cell (Antibody-  
producing Cell)**  
A type of lymphocyte that  
makes weapons called  
antibodies to fight antigens  
such as bacteria and viruses.

THERE'RE  
TOO MANY  
PEOPLE  
IN THESE  
ALLEYS!  
LET'S FIGHT  
IT IN A  
PLAZA!

NO  
GOOD!



SHAH!

SHA  
SHA!

WHOA!



THUD

OUT  
OF THE  
WAY,  
CELL!

GUH!

WHITE  
BLOOD  
CELL...



GAH!

CRASH

AUGH!!

CRASH

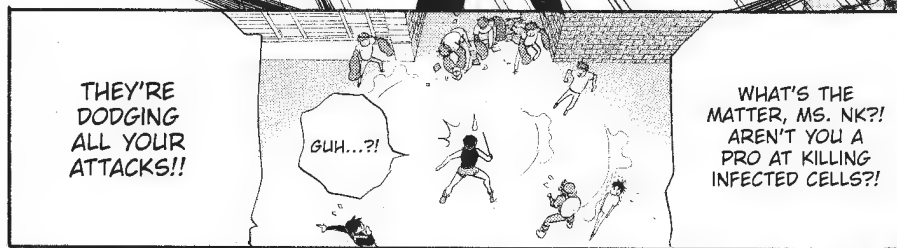






**NK Cell (Natural Killer Cell)**

Patrols the whole body and attacks cancerous and virus-infected cells.







**ROAR**

**WH-  
WHAT?!**

**THEY'RE  
CAUSING A  
STOMACH-  
ACHE!!!**

**CHAPTER 22: CYTOKINES**



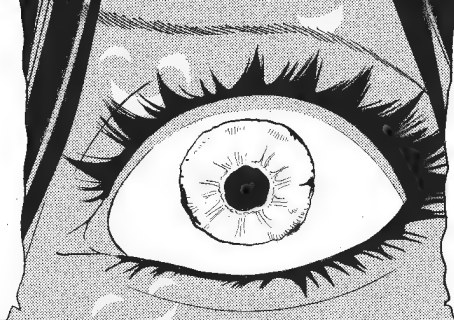






...KILL...  
THESE  
SCUM...  
GAH.

WHY...  
CAN'T  
I...



I JUST  
CAN'T...



I'M  
SUPPOSED  
TO BE...

A  
NATURAL-  
BORN  
KILLER...

ARE YOU  
WEAKENED  
BY  
STRESS?!

**Immunity and stress**  
Stress reduces  
lymphocyte activity and  
weakens immunity.

NK,  
ARE  
YOU—

MS.NK, WHAT'S  
WRONG?! YOU'RE  
OUR KEY TO  
FIGHTING VIRUS-  
INFECTED CELLS!



COULD  
IT BE—

H-HOLD  
ON,  
MS. NK,  
YOU  
CAN'T—

**CRAASH**

WHO'S  
GOING  
TO STOP  
THESE  
GUYS?!!

NK!  
SNAP  
OUT OF  
IT!

I  
CAN'T...

WHAT  
AM I  
DOING  
...?

I JUST...  
CAN'T  
ANY-  
MORE...

**FLICK**

**ヒュッ★**  
**BWOOSH**

NK!! DON'T  
STOP BELIEVING  
IN YOURSELF!  
WE'RE PROS!  
WE'VE TRAINED  
FOR THIS!

IF WE WORK  
TOGETHER, WE  
CAN DEFEAT ANY  
ENEMY!! PUT YOUR  
HEART INTO IT!!  
GET UP!! GET UP  
AND RUN!!

...HM?

**THWICK**

I DIDN'T  
KNOW!  
SORRY NK!!  
AND THANK  
YOU!!

EARLIER...  
I STOOD UP  
FOR YOU,  
NEUTROPHIL,  
BECAUSE  
PEOPLE  
WERE  
ON YOUR  
CASE...  
BUT YOU  
JUST GOT  
MAD AT  
ME...









WHAT  
IS IT?  
DID YOU  
SNAP  
OUT OF  
IT?!

**GYAAAH!!**



**TAT**

**DA**





WHO HAD  
THAT  
PICTURE...?!

SMASH

V  
V  
V  
M  
M  
M

!!



HEH  
HEH  
HEH...

BUT  
HOW...?!

NK! DID YOU  
BECOME  
ACTIVATED?!

コ<sup>II</sup>オ<sup>BW</sup>オ<sup>O</sup>オ<sup>O</sup>オ<sup>O</sup>オ<sup>SH</sup>オ<sup>O</sup>オ

THANKS TO THESE  
POLYSACCHARIDES  
YOU MADE—

MMM...  
THANK YOU  
SO MUCH,  
LACTIC ACID  
BACTERIUM.

NYU?

GULP

HEH  
HEH...

EXCUSE  
ME.

SNAP  
/ 10

キ

IT'S  
BEEN A  
LONG  
TIME...

NYU!

NYU!

GROW  
GROW

SWISH  
/ 10



...SINCE  
I'VE BEEN  
ACTIVATED!



HICcup!

**Dendritic Cells**

These cells take fragments of bacterial cells and virus-infected cells, and present them as antigens for other cells in the immune system.



HEY, THAT  
TORNADO'S  
CLOSING IN!  
LET'S GET OUT  
OF HERE!!

DENDRITIC  
CELL?! WHY  
ARE YOU  
DRESSED LIKE  
THAT...?







PLEASE SEE  
HOW YOU WERE  
WHEN YOU WERE  
YOUNGER, AND RECALL  
YOUR ENERGY AND  
ENTHUSIASM OF  
THOSE DAYS.

FLUSH

POP

ZAP

ZAP



HICCUP!

BUT...YOU  
WORK BETTER  
UNDER THESE  
CIRCUMSTANCES,  
DON'T YOU? WE  
HAVE THE DATA  
TO PROVE IT.

NO, I'D  
RATHER NOT  
HAVE TO DO  
ANYTHING SO  
DRASTIC.

THEN  
DON'T  
DO IT!







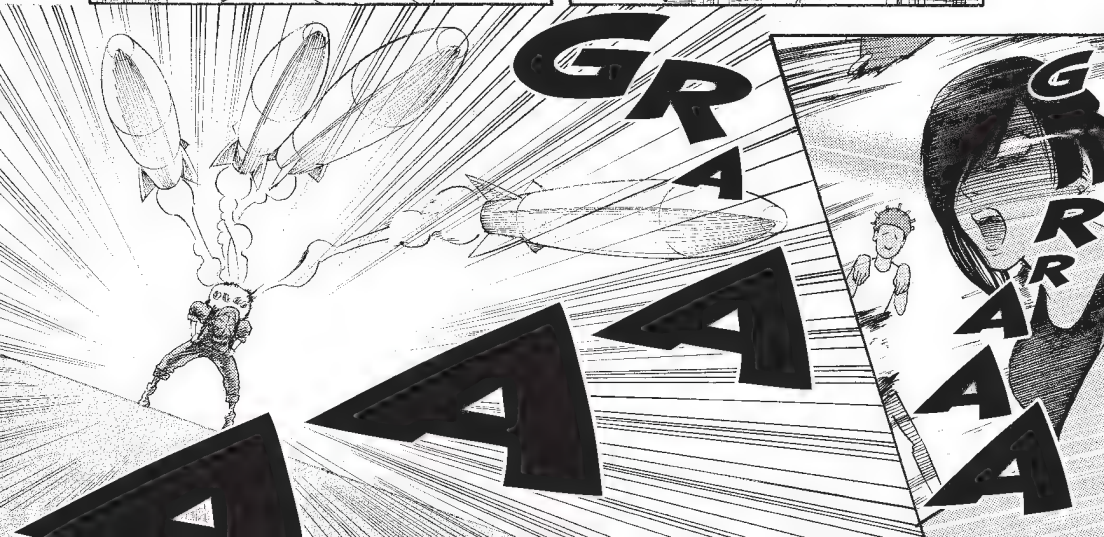
OKAY,  
EVERYBODY!

#### **Boosting Immunity**

The activation of dendritic cells is thought to increase the activity of NK cells and the production of antibodies against certain viruses by producing cytokines.











GRRRAAR

SMASH

KABOOM

SMASH

BOOM

BOOM

BAM

BAM

BAM

BAM

YES. IT'S  
ALL THANKS  
TO THE POLY-  
SACCHARIDES  
THIS LITTLE  
ONE MADE.  
♡

IT'S BECAUSE  
YOU ACTIVATED  
MR. DENDRITIC  
CELL THAT  
EVERYONE  
GOT ALL...  
LIKE THAT!

I  
SEE!

NYU?

Cookie Cookie Cookie

WE  
MANAGED  
TO BEAT THE  
INFLUENZA  
VIRUS  
BECAUSE OF  
YOU!!

LACTIC  
ACID  
BACTER-  
IUM!

YOUR  
FRIENDS  
ARE  
HERE.

LOOK  
AT ME...  
DROPPING  
YOU IN THE  
CANALS,  
GETTING  
BLOWN AWAY  
BY THE  
TORNADO...

YOU'RE  
ALL SO  
MUCH  
COOLER  
THAN ME.

YOU'RE  
SO  
SMALL...

BUT  
YOU'RE  
JUST  
AMAZING...

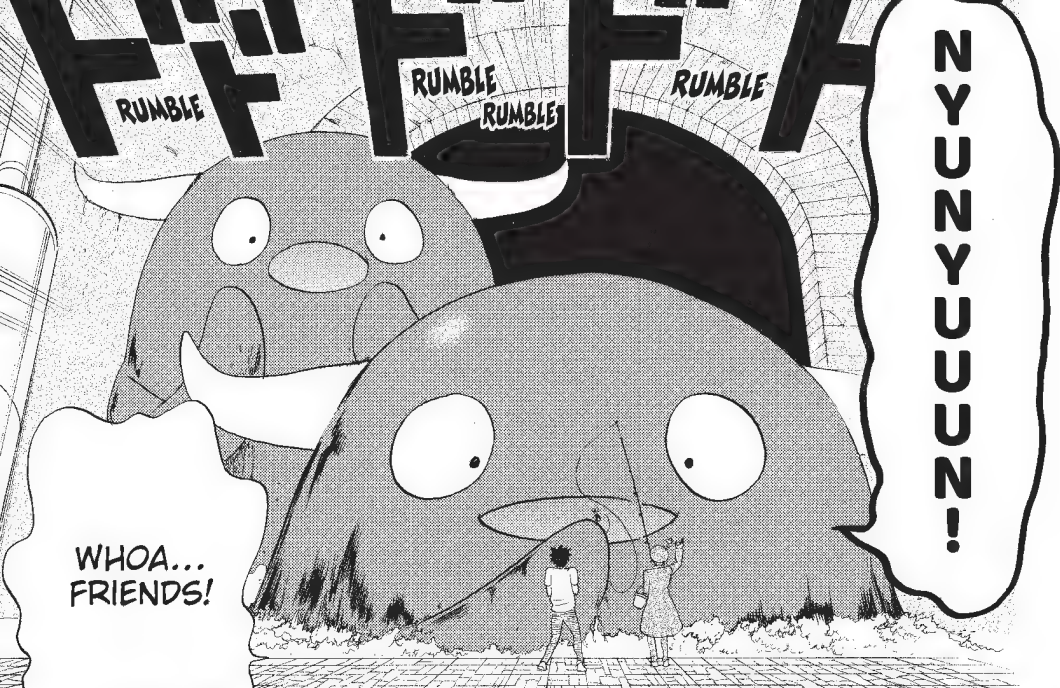
I'M  
SORRY FOR  
PUTTING YOU  
THROUGH  
SUCH A  
HARD TIME.

NYU...  
♡

OKAY!

?







OH RIGHT.

WHOA, YOU'RE COVERED IN BLOOD.

BY THE WAY, WHITE BLOOD CELL...

ONE LEFT TO GO.

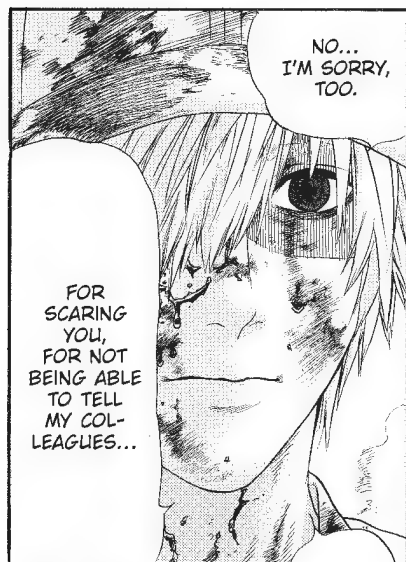


PHEN...

NYUUU!

RUMBLE

トトト



NO... I'M SORRY, TOO.

FOR SCARING YOU, FOR NOT BEING ABLE TO TELL MY COLLEAGUES...



I WAS REALLY GLAD THAT YOU CAUGHT THE LACTIC ACID BACTERIUM WHEN WE WERE BLOWN AWAY BY THE TORNADO... THANK YOU.



I'M SORRY... FOR YELLING AT YOU BACK IN THE CANALS.

EVEN THOUGH I WAS MAKING YOU HELP US.

I SAID SOME NASTY THINGS...



I'M SORRY.

FOR NOT BEING ABLE TO HELP...

IT'S OKAY.



...I'M GOING TO APOLOGIZE PROPERLY TO THE OTHERS, TOO.

GREAT, THEN...

I'M ACTUALLY HAVING SOME FUN ON THIS TR-



AND... DON'T FEEL LIKE YOU'RE MAKING ME HELP YOU.







**HUH?!**

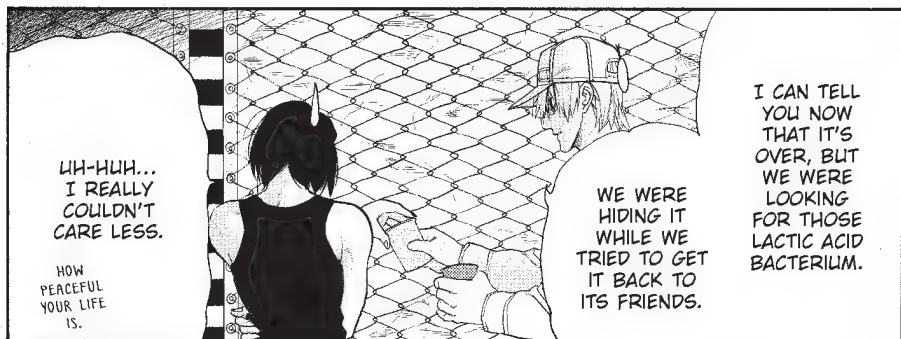
NK, I  
WANT  
TO TALK  
TO YOU.



**GRR!**

I'M  
GONNA  
KILL THAT  
LEAFY  
BASTARD...  
WAIT,  
NO!!

WHY  
AM I SO  
EMO-  
TIONALLY  
FRAGILE  
...?!



UH-HUH...  
I REALLY  
COULDN'T  
CARE LESS.

HOW  
PEACEFUL  
YOUR LIFE  
IS.

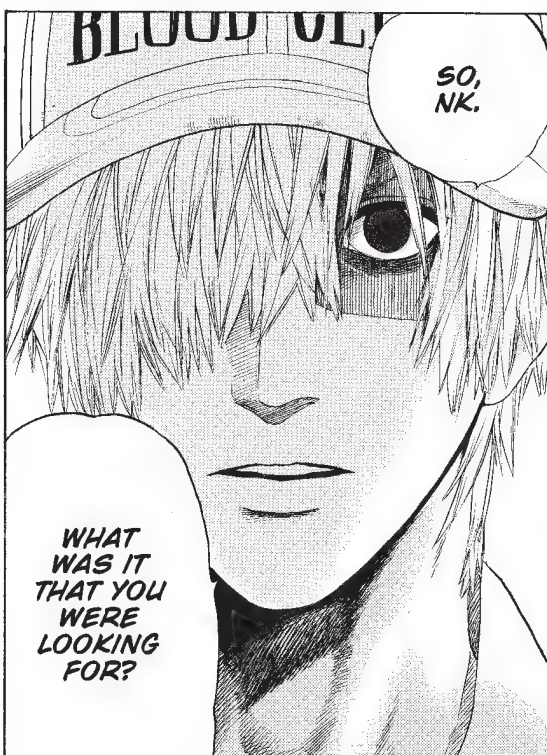
WE WERE  
HIDING IT  
WHILE WE  
TRIED TO GET  
IT BACK TO  
ITS FRIENDS.

I CAN TELL  
YOU NOW  
THAT IT'S  
OVER, BUT  
WE WERE  
LOOKING  
FOR THOSE  
LACTIC ACID  
BACTERIUM.



...OH.

SO THAT'S  
WHAT YOU  
WANT TO  
KNOW.



SO,  
NK.

WHAT  
WAS IT  
THAT YOU  
WERE  
LOOKING  
FOR?





IT'LL  
DOUBLE  
AS A  
WARNING.

FINE. IT'S  
NOT LIKE  
IT DOESN'T  
CONCERN YOU,  
TOO, SO I'LL  
TELL YOU.

WHAT?

...NO  
MATTER  
WHAT  
IT IS.

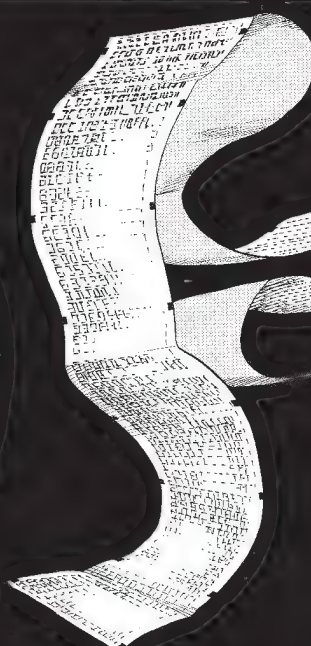
NEUTROPHIL,  
YOU SHOULD  
KILL THE  
ENEMY WITHOUT  
A SECOND  
THOUGHT...



YES...

AND  
YOU ALSO  
KNOW THAT  
WITH THAT  
INFORMATION,  
CELLS CAN BE  
"COPIED."

YOU KNOW  
THAT THE  
INFORMATION  
ON THE CELLS  
WE KILL ARE  
STORED AS  
ANTIGENS,  
RIGHT?



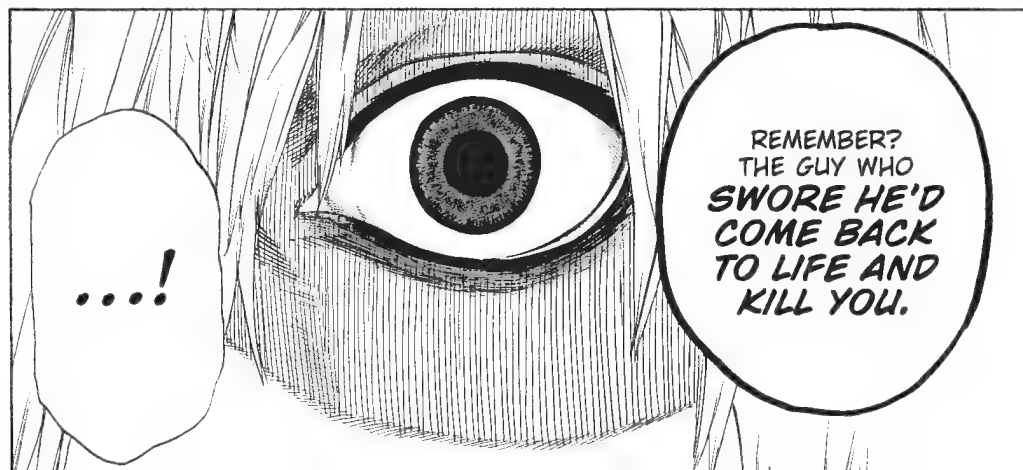
ALONG WITH  
THE GENETIC  
INFORMATION  
RECORDED  
WITH IT.

THE ANTIBODY  
INFORMATION  
OF A CERTAIN  
CELL WAS  
LEAKED.

WHAT?!



THAT CELL  
HAS ALREADY  
ACQUIRED A  
PHYSICAL FORM,  
SOMEWHERE IN  
THIS BODY.



...!

REMEMBER?  
THE GUY WHO  
SWORE HE'D  
COME BACK  
TO LIFE AND  
KILL YOU.



THAT'S  
WHO I'M  
LOOKING  
FOR.

HEH...

HEH HEH  
HEH...

IT'S  
SO NICE  
TO HAVE  
MY OWN  
BODY.

IS  
THAT  
SO?



AT  
LAST...!!

HEH HEH...  
AT LAST,  
I'LL FINALLY  
MEET YOU...



THIS'LL  
BE SO  
MUCH  
FUN.

CHAPTER 22: END

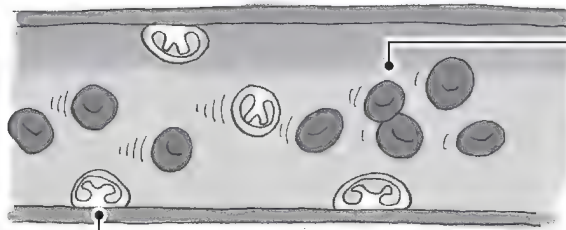


# RESIDENCE

## The Life and Work of White Blood Cell (Neutrophil): Where He Lives

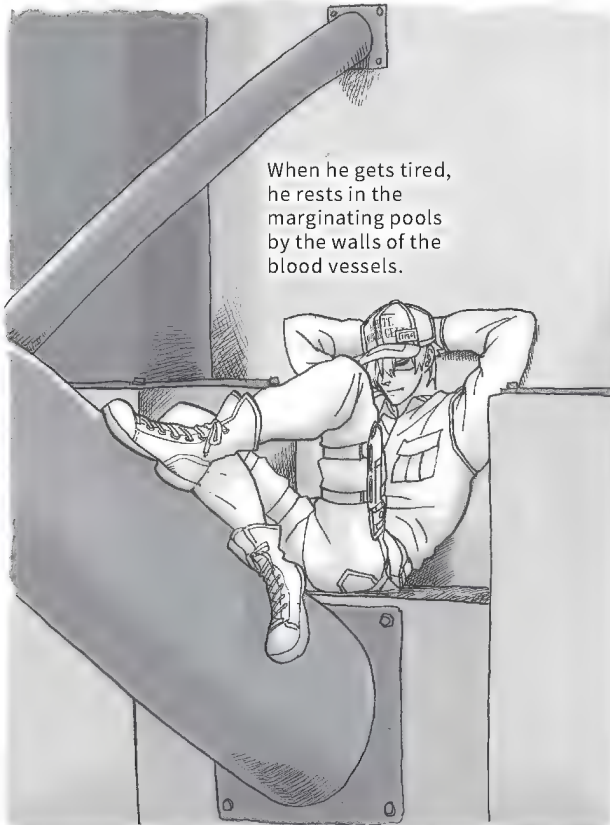
\* These are depictions created just for this comic, and differ from scientific fact.

Even though neutrophils patrol the body at all hours, there are places where they can rest. They live in the circulating and marginating pools in the blood vessels.



Circulating pools flow in the middle of the blood vessel.

Marginating pools stick to the vessel walls or flow slowly.



When he gets tired, he rests in the marginating pools by the walls of the blood vessels.

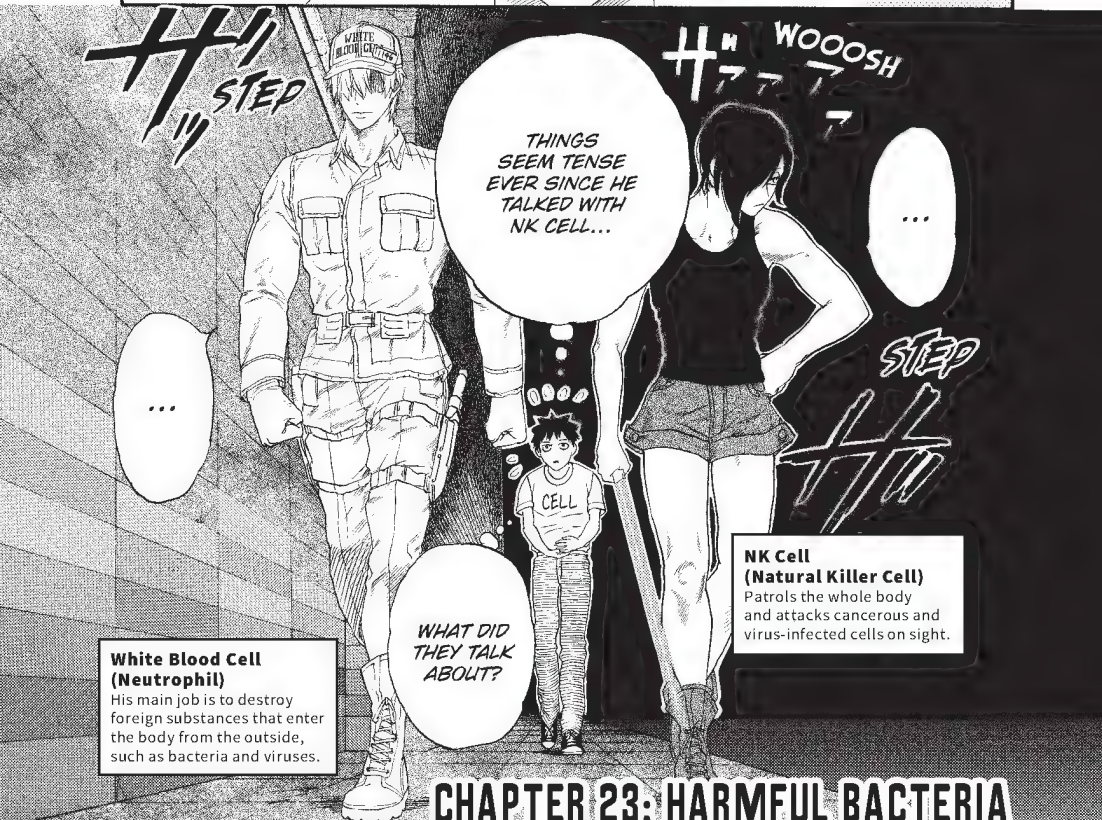


Cells at  
はたらく細胞 Work!



WHAT  
HAPPENED?

...



**White Blood Cell  
(Neutrophil)**

His main job is to destroy foreign substances that enter the body from the outside, such as bacteria and viruses.

**NK Cell  
(Natural Killer Cell)**

Patrols the whole body and attacks cancerous and virus-infected cells on sight.

## CHAPTER 23: HARMFUL BACTERIA



OH...  
WE'RE  
ALMOST  
THERE.

LOOK—

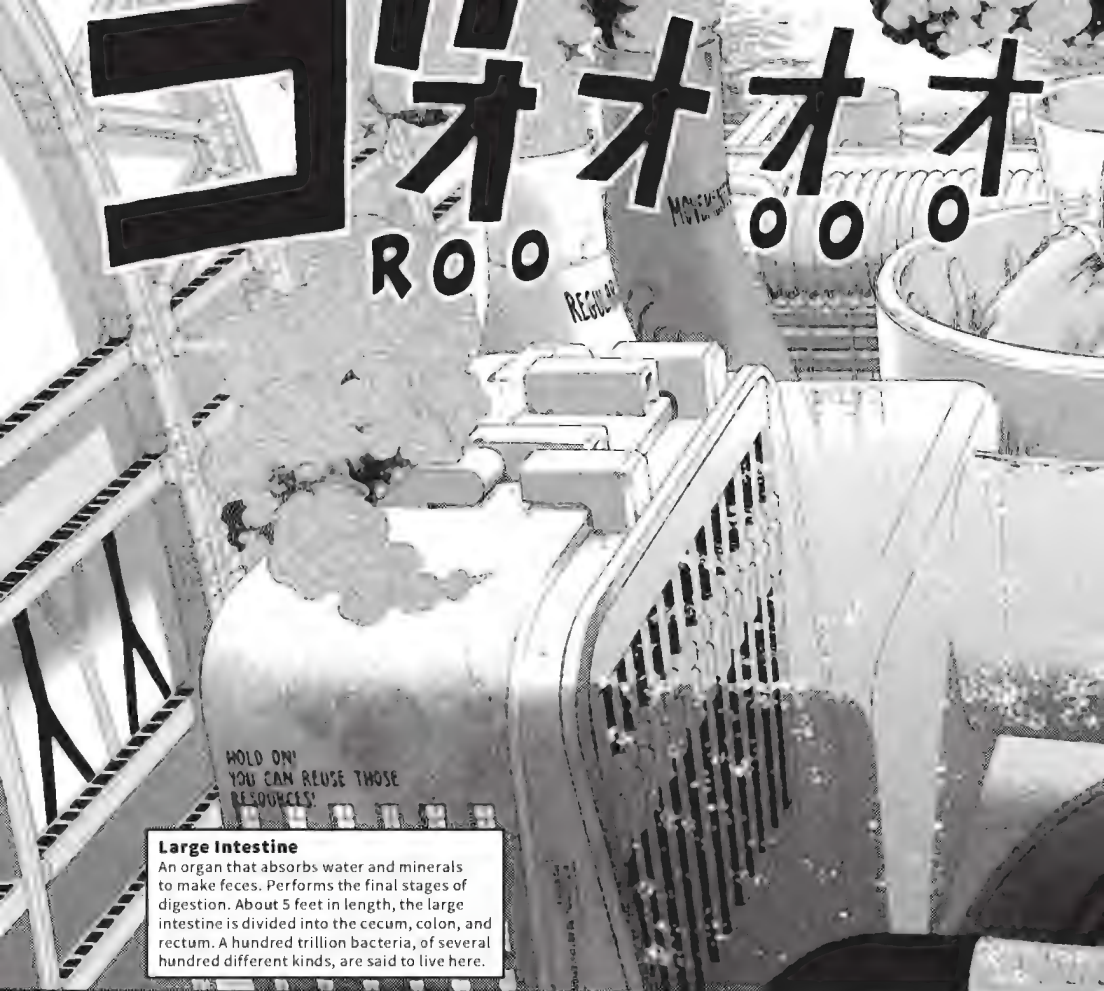
UM—DO  
WE HAVE TO  
GO MUCH  
FARTHER?

KEEP THE  
INTESTINES CLEAN

THIS IS  
THE LARGE  
INTESTINE.







### Large Intestine

An organ that absorbs water and minerals to make feces. Performs the final stages of digestion. About 5 feet in length, the large intestine is divided into the cecum, colon, and rectum. A hundred trillion bacteria, of several hundred different kinds, are said to live here.



YES...  
THAT'S TOXIC  
GAS FROM  
HARMFUL  
BACTERIA  
LIVING IN THE  
INTESTINE.

IS  
SOMETHING  
WRONG?

THE BALANCE  
BETWEEN THE  
INTESTINAL  
BACTERIA MUST  
BE OFF, WITH  
THE HARMFUL  
BACTERIA  
HAVING THE  
ADVANTAGE.



THIS IS  
PRETTY  
BAD.

COUGH!

IT'S IN  
BAD  
SHAPE.

### Harmful bacteria

Include pathogenic Escherichia coli, Staphylococcus, and Clostridium. They break down proteins and make harmful byproducts.

...HARMFUL BACTERIA THAT HURT THE BODY...

### The balance between intestinal bacteria

A typical ratio in a healthy individual is 20% good bacteria, 10% harmful bacteria, and 70% opportunistic bacteria.

### Good bacteria

Include lactic acid bacteria, L. gasseri, and Bifidobacterium. They can help strengthen immune response and promote intestinal activity.

IN THE INTESTINES, THERE ARE ROUGHLY THREE TYPES OF BACTERIA:

GOOD BACTERIA THAT BENEFIT THE BODY...

...AND OPPORTUNISTIC BACTERIA.

### Opportunistic bacteria

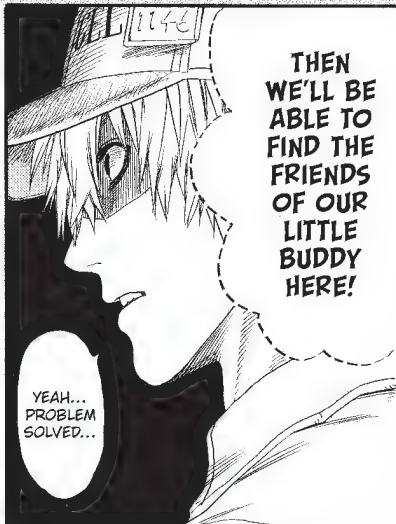
Include Bacteroides, nonpathogenic Escherichia coli, and Eubacterium. Neither helping nor harming the body, they work with whichever bacteria that have the advantage.

HE SAYS "PROBLEM SOLVED," BUT HE SURE ISN'T ACTING LIKE IT...



THEN WE'LL BE ABLE TO FIND THE FRIENDS OF OUR LITTLE BUDDY HERE!

YEAH... PROBLEM SOLVED...



ロウ  
"ROAR."

IT'S SAID THAT THE TOTAL NUMBER OF BACTERIA CAN BE A HUNDRED TRILLION.



WOW, THAT MANY!

SHIFTS IN THE POWER BALANCE BETWEEN THEM CAN CAUSE CHANGES IN THE HEALTH OF THE BODY.





UMMM

NYU!

NYU  
NYUN!

I BET YOU  
HAVE SOME  
AMAZING  
POWERS,  
TOO!

**Lactic Acid Bacteria**

Good bacteria that supports the health of the human body. They have a variety of specialties.



OH! HEY  
LACTIC ACID  
BACTERIUM,  
YOU HAVE  
NOTHING TO  
WORRY ABOUT  
NOW.

WE CAME TO A  
PLACE WHERE  
LOTS OF YOUR  
FRIENDS ARE!



STOP,  
NK WILL  
SEE!  
SHE'S PRETTY  
SHARP.

NYUU!

NYUU  
NYUUU  
NYUUU!

HEY HEY!  
STOP  
BOUNCING  
AROUND!

I  
ALREADY  
KNOW.

THIS IS SO  
STUPID.



ATTEN-  
HUT!!

GOO OOOAR

LOOK, I DON'T  
CARE WHAT  
YOU GUYS ARE  
UP TO, BUT  
KEEP IT DOWN,  
WILL YOU?

I DON'T WANT  
HIM TO CATCH  
ON TO WHAT  
WE'RE DOING.





WE'LL JOIN  
YOU AS SOON  
AS THERE'S  
AN ANTIGEN  
PRESENTATION  
SIGNAL!!

GOOD.

WATCH  
YOURSELF,  
BOSS!



EVEN AS A  
MEMORY T  
CELL, I CARE  
ABOUT YOU  
GUYS JUST  
AS DEEPLY.

YOU MIGHT  
MISS ME,  
BUT BE  
STRONG!

#### Memory T Cells

Some Killer T cells  
become Memory T  
cells, and prepare to  
attack in case the same  
enemy appears again.

PUTTING THAT  
EXPERIENCE  
TO USE, I'LL  
NOW ACT AS  
A MEMORY  
T CELL...

I'VE  
FOUGHT  
HIM  
ONCE!



I'M  
THE ONLY  
ONE WHO  
KNOWS OUR  
ENEMY'S  
TRICKS AND  
HOW TO  
HIT HIM  
WHERE IT  
HURTS...

ALTHOUGH,  
AS YOUR  
BOSS, I AM  
WORRIED  
IF YOU'LL  
BE ABLE  
TO FIGHT  
WITHOUT  
ME...

...AND GO  
TO THE  
FRONT  
LINES TO  
TAKE HIM  
DOWN!!

IS HE  
CONFUSING  
IT FOR A  
PROMOTION...?

BOSS  
LOOKS  
HAPPY.



BUT IF  
WE AREN'T...  
I'LL SEE  
YOU GUYS IN  
HELL...!!

BOSS...!!

THERE'S NO  
TELLING IF  
WE'LL ALL BE  
ALIVE WHEN  
WE SEE  
EACH OTHER  
AGAIN...

I SWEAR  
ON THIS  
HAT THAT  
I'LL  
COMPLETE  
MY  
MISSION.



OUTTA  
MY  
WAY.

I WAS JUST  
WONDERING WHAT  
YOU ORDER-TAKING  
LACKIES WERE  
WASTING YOUR TIME  
WITH DOWN HERE.

N  
K  
!!!



OR  
ARE YOU  
PUTTING  
ON A  
PLAY?

A  
FAREWELL  
PARTY?

HOW  
NICE.





NK!  
DON'T TRY  
TO BOOST  
YOUR OWN  
CONFIDENCE  
BY  
ATTACKING  
KILLER T!

NK.  
WHAT  
DO YOU  
HAVE  
AGAINST  
ME?



I WONDER  
IF YOU'LL  
BE ABLE TO  
REMEMBER  
THE ENEMY  
WITH YOUR  
REFLEXES  
DULLED BY  
PEACE?

EH,  
MEMORY  
T CELL?



HA  
HA  
HA!



OOPS!

**YOU'RE  
THAT  
CELL THAT  
PLAYED  
JOKES ON  
US WITH  
THE RHINO-  
VIRUS!!**



MEMORY  
...

DON'T YOU SEE  
THIS HAT?!  
YOU'LL CALL  
ME **MEMORY T**  
TODAY!!

DID  
YOU JUST  
CALL ME  
KILLER T?!

NGH!  
HEY,  
NEUTRO-  
PHIL.

↑  
7°  
FLOAT  
↑  
7°  
FLOAT



...HM?

I  
KNOW  
YOU...



N-NO!  
I'M NOT!  
I'M NOT!  
I'M NOT!  
I'M NOT!  
I'M NOT!  
I'M NOT!

WHAT'RE  
YOU DOING  
HERE?!  
HUH?!

ARE YOU GONNA  
CHUM IT UP WITH  
SOME BACTERIA  
FOR YOUR NEXT  
SCHEME?!

TH-THAT'S  
NOT TRUE.  
IT MIGHT LOOK  
LIKE IT'S TRUE  
BUT REALLY  
IT'S NOT.

AND WHAT  
ARE YOU  
DOING  
RELAXING  
WITH A  
REGULAR  
CELL?!

AT THIS  
RATE YOU  
WON'T EVEN  
BE ABLE  
TO KILL A  
GERM!

UM... I  
THINK I'M  
MISSING  
SOME-  
THING.

WHO'S THIS  
"HE" YOU GUYS  
KEEP TALKING  
ABOUT...?

THEY'RE  
MORONS,  
ALL OF  
THEM.

I AM NOW  
PREPARING FOR  
BATTLE. CELL BOY, IT'S  
DANGEROUS HERE,  
SO YOU SHOULD GET  
SOMEPLACE SAFE.

NO,  
THAT'S JUST  
NOT POSSIBLE.  
I'M A NATURAL-  
BORN KILLING  
MACHINE.

RIGHT!  
RIGHT!

NYUUUU!

WHAT'S THAT  
SQUEALING?

YEAH! YOU'LL  
TOTALLY BE  
IN OUR WAY  
WHEN WE  
HAVE TO  
FIGHT HIM!!

WHITE  
BLOOD CELL

A  
CANCER  
CELL.

CANCER  
CELL?!!

C...

CELL





I'M SORRY  
I COULDN'T  
BE WITH  
YOU UNTIL  
THE END  
OF YOUR  
JOURNEY.

IT'S TIME  
FOR ME  
TO GET  
BACK TO  
WORK.

OF COURSE  
HE'S  
DANGEROUS.

THAT'S WHY  
WE HAVE TO  
HUNT HIM  
DOWN AS  
SOON AS  
POSSIBLE.

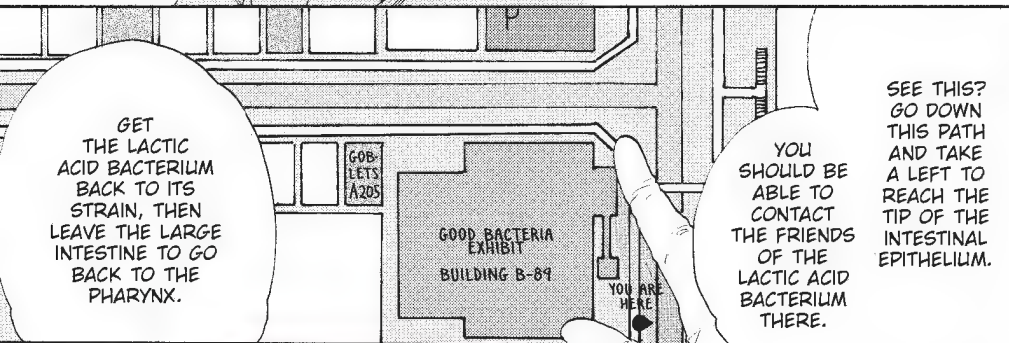


TH-TH-  
THAT  
SOUNDS  
LIKE A  
REALLY  
DANGEROUS  
ENEMY...



WE'LL  
PART  
WAYS  
HERE.

SO,  
CELL  
BOY—



GET  
THE LACTIC  
ACID BACTERIUM  
BACK TO ITS  
STRAIN, THEN  
LEAVE THE LARGE  
INTESTINE TO GO  
BACK TO THE  
PHARYNX.

YOU  
SHOULD BE  
ABLE TO  
CONTACT  
THE FRIENDS  
OF THE  
LACTIC ACID  
BACTERIUM  
THERE.

SEE THIS?  
GO DOWN  
THIS PATH  
AND TAKE  
A LEFT TO  
REACH THE  
TIP OF THE  
INTESTINAL  
EPITHELIUM.



TELL  
ME ONE  
THING  
BEFORE  
YOU GO!

OH-  
WHITE  
BLOOD  
CELL,  
WAIT.



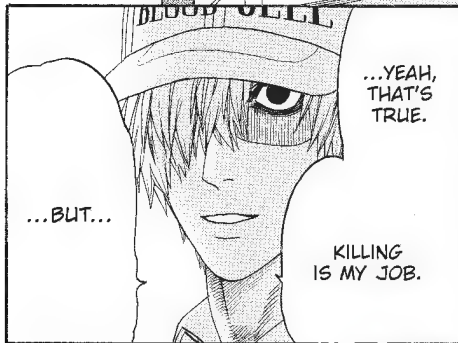
DO YOU  
HAVE ANY  
QUESTIONS?  
I TRUST  
YOU'LL  
BE ALL  
RIGHT.

BE MINDFUL  
OF YOUR  
SURROUND-  
INGS, AND BE  
CAREFUL.

UM,  
SURE.  
THANKS.



WHITE  
BLOOD CELL...  
WHY DID YOU  
PROTECT US?



...BUT...

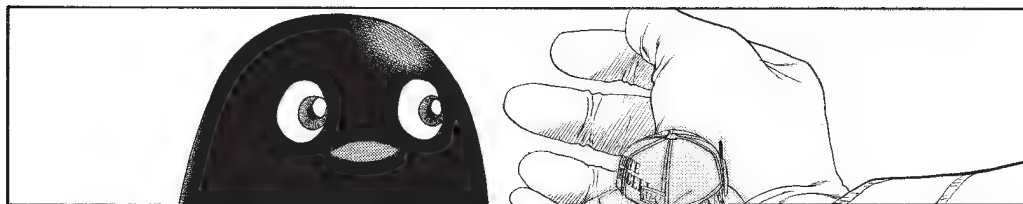
...YEAH,  
THAT'S  
TRUE.

KILLING  
IS MY JOB.



...IF IT'S  
FOR THE  
BODY.  
THAT'S  
YOUR JOB.  
SO WHY?

IMMUNE  
CELLS ARE  
SUPPOSED  
TO KILL  
BACTERIA  
AND  
INFECTED  
CELLS WHO  
USED TO BE  
ON YOUR  
SIDE...



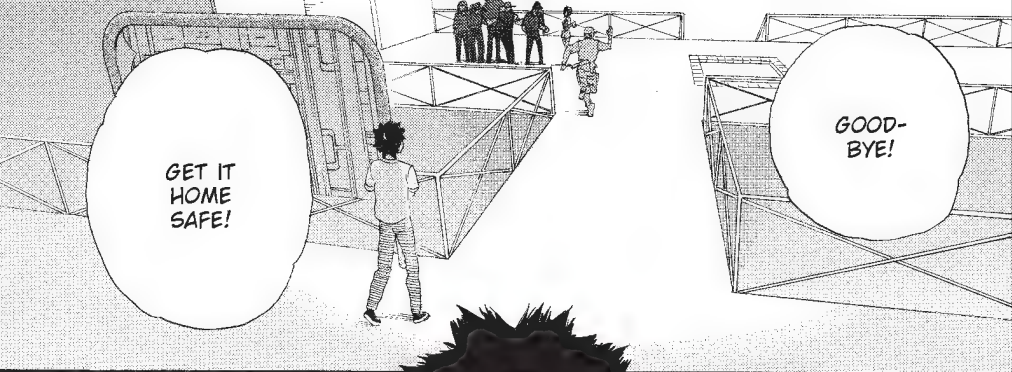
MAYBE I  
NEEDED A  
BREAK FROM  
ALL THE  
KILLING.

MAYBE  
THAT'S  
WHY.

**Immune cells and gut bacteria**

It's said that immune cells attack pathogens that infiltrate the body, but not gut bacteria that co-inhabit the body, even when they are non-self antigens.





コオオオ  
Roo OOO  
OARR

THEY SAY THERE  
ARE COUNTLESS  
BACTERIA ON THE  
OTHER SIDE OF  
THESE WALLS.

CELL

NYUUU!

ホ  
ボ GLRP  
GLRP

コ  
ボ GLRP  
GLRP

NYUU!

IT'S  
ALMOST  
GOOD-  
BYE.

IT WAS  
SCARY AT  
TIMES...

YOU  
KNOW—

NYUU!!

...BUT I  
HAD FUN,  
LACTIC ACID  
BACTERIUM!



SO I...  
NEVER HAD  
PLAYMATES  
AS A KID...

...I WAS ALWAYS  
BORED...  
AND UNHAPPY...  
AND LONELY.



THE CELL  
THAT MADE  
ME...

...WAS INFECTED  
WITH SOMETHING  
AND KILLED BY  
AN IMMUNE CELL  
SOON AFTER I  
WAS BORN.

NYUN!!  
NYUU  
NYU!!

HEE  
HEE  
HEE.



...AND  
TRAVELING  
ALL OVER  
THE BODY!!

SO  
I HAD  
A LOT  
OF FUN  
MEETING  
YOU...

DON'T  
GIVE UP,  
GOBLET  
CELL!!

IT'S NO USE!  
THE BACTERIAL  
ATTACKS ARE  
TOO MUCH. IT'S  
ONLY A MATTER  
OF TIME!

HUH?

#### Intestinal Epithelial Cells

Responsible for absorbing fluids and nutrients. They also build up a mucous barrier to prevent excessive immune response against the intestinal bacteria.

#### Goblet Cells

Mucous secreting cells that secrete the viscous substance mucin. They also live in the small intestine, but are especially prevalent in the large intestine.

Intestinal Barrier Sealings

mucin

mucin

mucin

mucin

mucin

mucin

mucin

mucin

GOBLET

KACHUNK

KACHUNK



NYU!

IT LOOKS LIKE THEY'RE IN TROUBLE.

WE INTESTINAL EPITHELIAL CELLS HAVE TO STOP THEM WITH THE INTESTINAL BARRIER!!



DO YOU KNOW HOW MANY BACTERIA ARE ON THE OTHER SIDE OF THIS WALL?!



EEK!

AAAAUGH! I'M TELLING YOU, EVEN IF WE GO NOW, THERE'S NO WAY WE'D MAKE IT IN TIME!

CRACK



LIKE I SAID, WE'RE AT OUR LIMIT HERE...!

ISN'T THAT OUR MOTTO?! WE HAVE TO TRY UNTIL WE CAN'T!!

OUR INTESTINAL BARRIERS HAVE TO BE AS FIRM AS OUR WILL!!



DON'T GIVE UP!!

THERE'S NO WAY! COME BACK!





トドトドトド  
RR RO AR

WH-  
WH...

WHAT'S  
THAT?!

AGH

AGH

NO...  
ALL THAT  
MUCIN WE  
PLANTED...



...THAT WE  
HAD BEEN  
WORKING  
SO  
HARD TO  
REACH...!

HEH HEH  
HEH...  
SO THIS IS  
THE OTHER  
SIDE OF THE  
INTESTINAL  
WALL...

THERE'S NOT  
EVEN A HINT  
OF ANY STYLE  
OR TASTE.

NOW THAT  
WE'RE HERE,  
IT'S NOT  
MUCH TO  
LOOK AT.

WHO CARES?  
WE'LL TURN  
THIS INTO A  
PARADISE FOR  
US HARMFUL  
BACTERIA.





WE FIRST  
HAVE TO  
WIPE OUT  
ALL THE  
WEEDS,  
HMM?

BUT  
TO DO  
THAT...

EEP...



HERE  
WE GO!

WHAM  
WHAM

BAM  
BAM

ALUGH!

SPLOSH

SPLOSH

SPLOSH

BE COURTEOUS WHEN YOU  
TRANSMIGRATE.

3 STEP

STEP

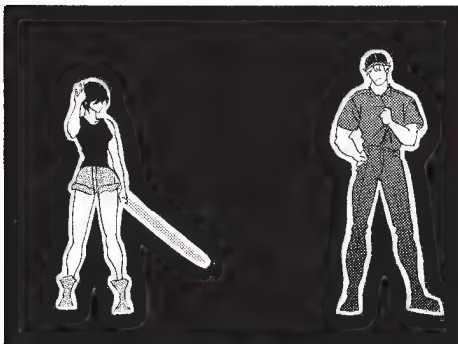
DRIP

OH...  
THE PATH  
GETS  
NARROW  
HERE.

LYMPH DUCTS (INTESTINES)

### Immune cells and gut bacteria

It's said that immune cells attack pathogens that infiltrate the body, but not gut bacteria that co-inhabit the body, even when they are non-self antigens.







WHY'RE YOU FOLLOWING ME?! YOU'RE SUPPOSED TO BE A LONER!!

I SHOULD BE TELLING YOU THAT! AND YOU BUMPED INTO ME FIRST!!

HOW WOBBLY ARE YOU?! GO HOME!! YOU'RE GONNA GET IN THE WAY!!!

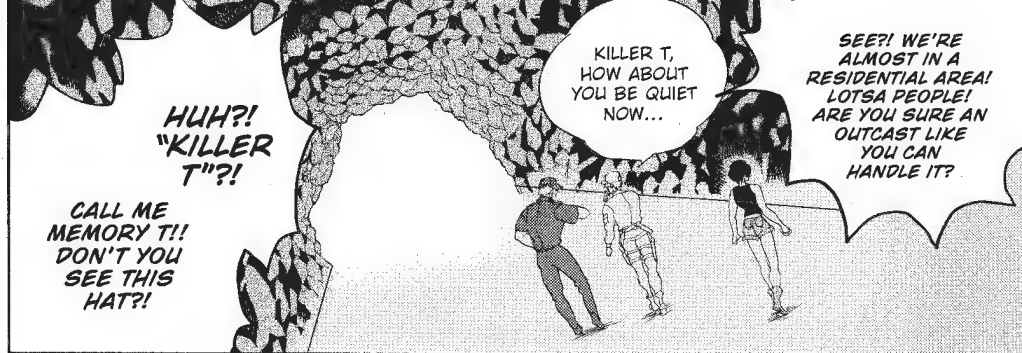
MY YEARS OF EXPERIENCE AND INSTINCT SAY HE'S THIS WAY!! YOU'RE THE ONES FOLLOWING ME!!

STOP BEATING ON EACH OTHER BEFORE THE FIGHT...

HEY...

BOOM





HUH?!  
"KILLER  
T"?!  
CALL ME  
MEMORY T!!  
DON'T YOU  
SEE THIS  
HAT?!

KILLER T,  
HOW ABOUT  
YOU BE QUIET  
NOW...

SEE?! WE'RE  
ALMOST IN A  
RESIDENTIAL AREA!  
LOTS A PEOPLE!  
ARE YOU SURE AN  
OUTCAST LIKE  
YOU CAN  
HANDLE IT?



HE'S  
RIGHT.  
ARE YOU  
STUPID OR  
SOME-  
THING?

THE ENEMY  
COULD BE  
ANYWHERE!!

ALL RIGHT,  
NOW  
QUIET!!

GLARE

WHY—WHY ARE  
YOU CHEWING ME  
OUT?! IT'S NOT  
FAIR!!

SHH!!



LOOKS  
LIKE HE'S  
COMING  
STRAIGHT  
AT US THIS  
TIME.

CRACK  
ビュッ

CRACK  
ビュッ

ビュッ  
CRACK











SLASH

LEAP


WHITE  
BLOOD CELL

NK!  
GO!!

WHOOSH

!





DID YOU  
COME BACK  
TO LIFE...

**DIE!**

**SLAB**

**CANCER  
CELL!!!**

...JUST  
TO COM-  
PLAIN  
SOME  
MORE?!







WHERE'S...  
HIS VOICE  
COMING  
FROM...?



WHAT  
?!!





スマッシュ

クラッシュ

RUMBLE

ズ"ズ"ズ...

クラッシュ

クラッシュ

ガァァァ



GASP!

WHOOOM

AAAAAGH!

WHITE  
BLOOD CELL

HA HAH  
HAH...  
I'M SO  
HAPPY.

IT'S  
THE SAME  
THREE OF  
YOU FROM  
BEFORE.

THUD

GAH-





**Cancer cells**

Cells that multiply uncontrollably due to a genetic anomaly. They overstep the boundaries with neighboring normal cells.

IT'S  
GOOD  
TO SEE  
YOU.

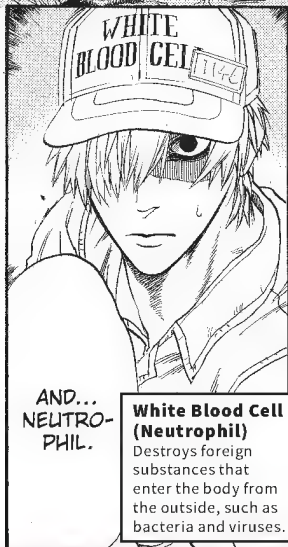
**CHAPTER 23: END**





**Cells at**  
**Work!**  
はたらく細胞





AND...  
NEUTRO-  
PHIL.

**White Blood Cell (Neutrophil)**  
Destroys foreign substances that enter the body from the outside, such as bacteria and viruses.



MEMORY  
T CELL.

FOR-  
MERLY  
KILLER  
T-

**Memory T Cell**

Some Killer T cells become Memory T cells and prepare to attack in case the same enemy appears again.

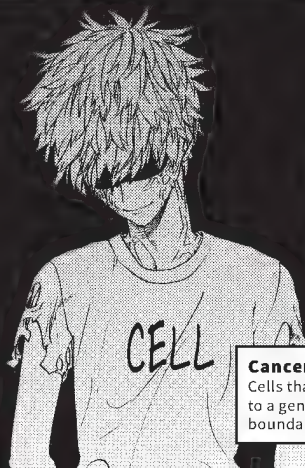


...NK  
CELL.

**NK Cell (Natural Killer Cell)**

Patrols the whole body and attacks cancerous and virus-infected cells on sight.

YOU SAME  
THREE CELLS,  
STROLLING  
RIGHT UP TO  
ME...  
HEH HEH.



...WHAT  
THEY CALL  
"FATE."

THIS  
MIGHT  
BE...

**Cancer cells**

Cells that multiply uncontrollably due to a genetic anomaly. They overstep the boundaries with neighboring normal cells.

## CHAPTER 24: CANCER CELL II (PART I)



...WHICH  
OF US...

NOW  
LET'S  
DECIDE  
ONCE  
AND FOR  
ALL...

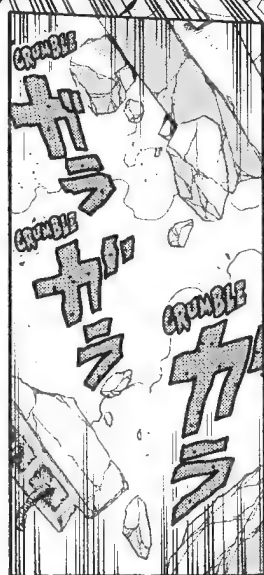
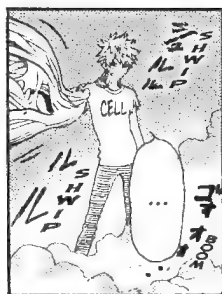


....!!

...IS  
ON THE  
SIDE OF  
JUSTICE.









WHAT  
PREDICTABLE  
ATTACKS.☆

HAH.

は TA DAH ン

HEY!! UNTIE  
US BEFORE  
YOU STRIKE  
A POSE!!

THANKS,  
NK!!

DID  
YOU REALLY  
THINK  
YOU COULD  
WIN THIS  
TIME?

WHY  
DID YOU  
COME BACK  
TO LIFE  
KNOWING  
YOU'D JUST  
BE KILLED  
AGAIN?

SO, KIDDO,  
CAN YOU  
TELL ME?

I  
JUST...

...I'M...

...NOT  
HERE TO  
START A  
FIGHT.

DON'T YOU  
KNOW YOU  
SHOULDN'T  
START A FIGHT  
AGAINST  
AN ENEMY  
WHO KNOWS  
ALL ABOUT  
YOU...? HM?

THIS  
IS MY  
SECOND  
TIME  
FIGHTING  
YOU.

...FOUND  
WHAT IT  
IS I'M  
SUPPOSED  
TO DO.

BLOK

BLOK

BLOK

BLOK

I JUST  
WANTED THE  
THREE OF  
YOU TO BEAR  
WITNESS  
TO IT.

CRACK

CRACK  
CRACK





THESE  
ARE THE  
SAME AS MY  
PUPPET FROM  
EARLIER.

HEH HEH...  
SURPRISED?



THERE'S  
NOTHING  
YOU CAN  
DO TO STOP  
THEM.

YOU  
CAN'T KILL  
THEM WITH  
SWORDS.  
...THEY'LL  
KEEP MOVING  
FOREVER.

THEY'RE ALL  
A PART OF  
MY TISSUE.



SHOOM

SO SIT TIGHT,  
AND YOU'LL  
BE GOOD AND  
CAPTURED SOON  
ENOUGH.

BUNGE

YOGI



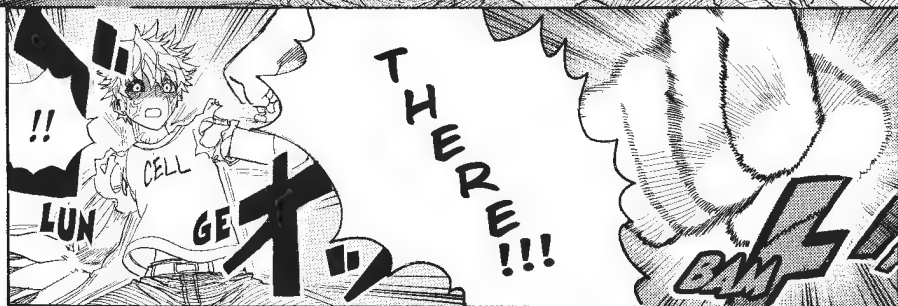




...YOU'RE  
GOING TO  
DO NEXT!!

...EXACTLY  
WHAT...

VNBEEM



CATCH







...BUT A  
CELL BORN  
OF THIS  
BODY...

HE IS NOT  
AN ENEMY  
FROM THE  
OUTSIDE...

...JUST  
LIKE US.



...ATTACKS  
AGAINST  
THE BODY  
ITSELF.

I WILL  
NOT  
ALLOW...



**Regulatory T Cell**  
She regulates the activity  
of T cells to prevent  
immune system anomalies.







N-  
NEUTRO-  
PHIL!!



GAH...  
COUGH.

I KNEW  
YOU'D TRY AND  
PROTECT YOUR  
FRIEND.

HAA HAH.  
I KNEW IT.



GAH  
...!!





HAAH!  
HAAH!

HAAH!

SPLASH

SPLASH

KACHUNK  
KACHUNK

どきどき

ARE THOSE  
GERMS STILL  
BEHIND US?!

SPLASH

### Intestinal Epithelial Cells

Responsible for absorbing fluids and nutrients. They also build up a mucous barrier to prevent excessive immune response against the intestinal bacteria.

### Goblet Cells

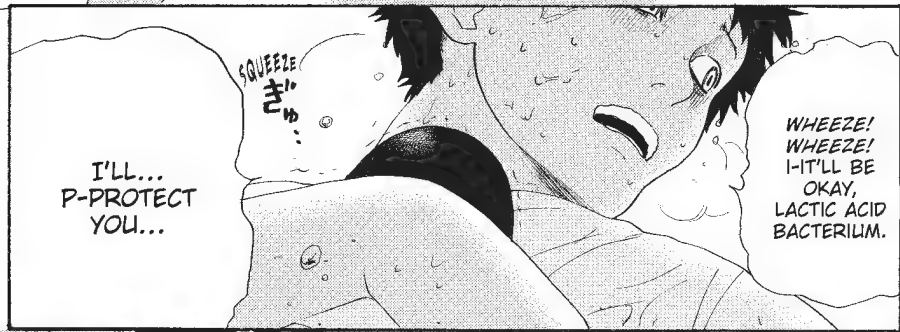
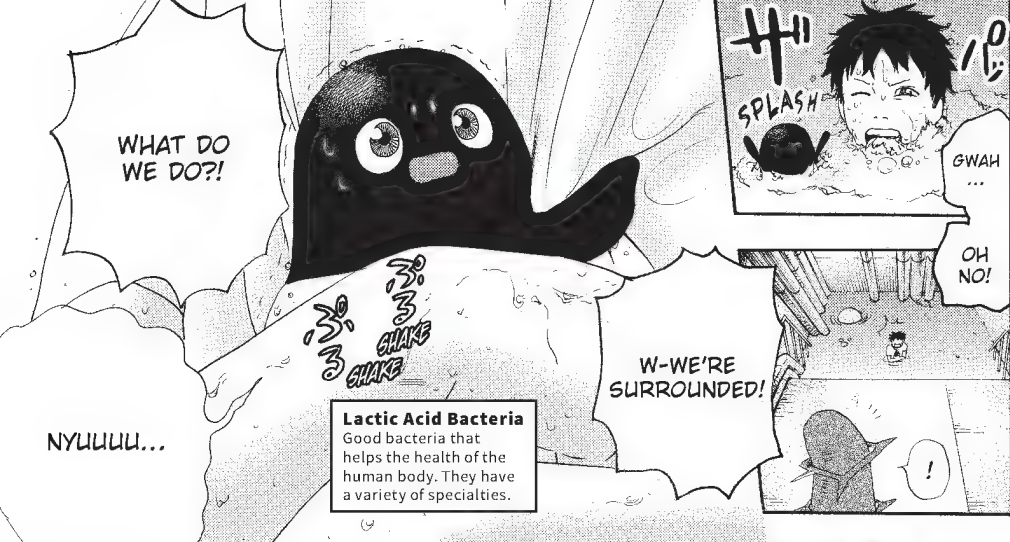
Mucous secreting cells that secrete the viscous substance mucin. They also live in the small intestine, but are especially prevalent in the large intestine.

I DON'T  
KNOW!!  
JUST KEEP  
RUNNING!!

SPLASH  
SPLASH







**Lactic Acid Bacteria**  
Good bacteria that helps the health of the human body. They have a variety of specialties.

**Harmful Bacteria**  
Include pathogenic *Escherichia coli*, *Staphylococcus*, and *Clostridium*. They break down proteins and make harmful byproducts.

WHAT DO  
YOU SAY  
TO THIS?

SHOOM

LET'S  
SEE YOU  
TRY AND  
PROTECT  
IT.

GAAAGH!

NYUU!!

SHOOM

THE TOXIN  
ATTACK OF  
A HARMFUL  
BACTERIUM.

#### Effects of harmful bacteria

Examples of the damage done by harmful bacteria include intestinal putrefaction and the production of toxins and carcinogens. These can cause a variety of negative effects on the human body, such as drop in immune function, an unpleasant change in the smell of stools and gas, and diarrhea or constipation.

WE'RE  
GOING TO  
MAKE YOU  
SUFFER IN  
ALL SORTS  
OF WAYS.

SO MAKE  
SURE YOU  
SCREAM  
NICE AND  
LOUD  
FOR US.

GAH...

EH  
HEH  
HEH  
HEH

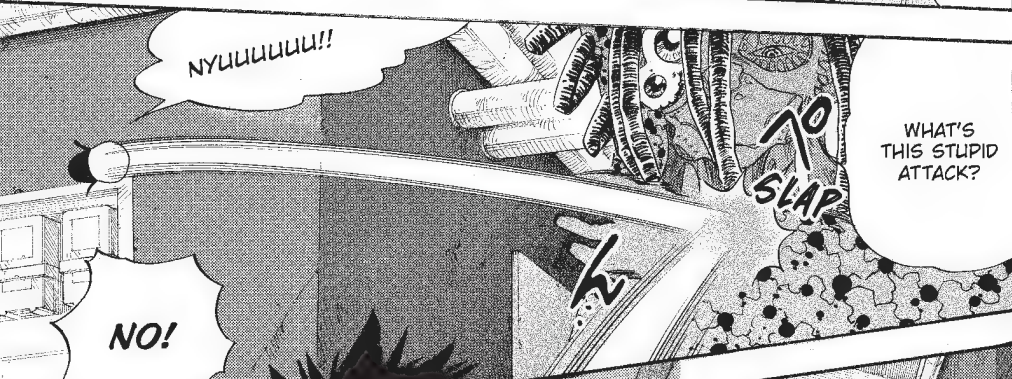
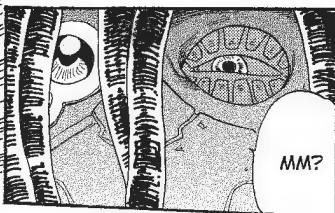
WE'RE  
COUNTING  
ON YOU TO  
ENTERTAIN  
US, LITTLE  
CELL.

WE CAME  
ALL THE WAY TO  
THE OTHER SIDE  
OF THE INTESTINAL  
WALLS, AND  
WE'RE JUST  
HEARTBROKEN  
TO FIND WHAT A  
BORING PLACE  
IT IS.

ALIGH!  
MY FEET!

NYUUUU!!







**RUN  
SOMEWHERE  
FAR AWAY!!**

NYU!

**GET  
AWAY,  
LACTIC  
ACID  
BACTERI-  
UM!!**



NYUUU  
NYUUU!!  
NYUUU!!

NYU...  
NYU.

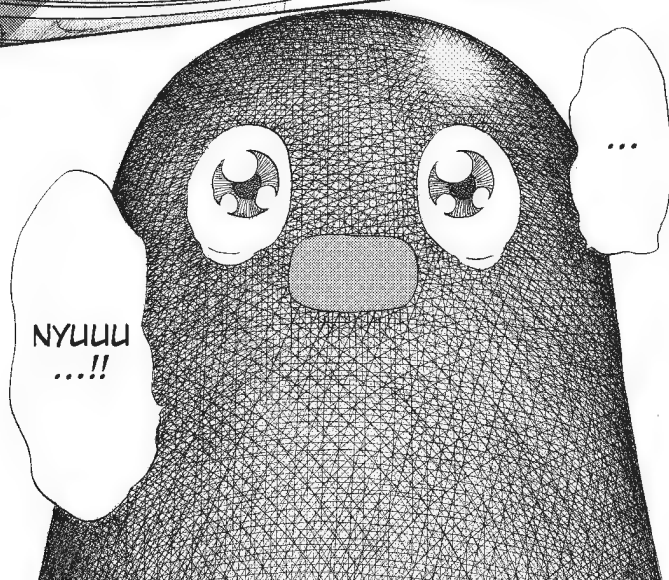
FLAP はて

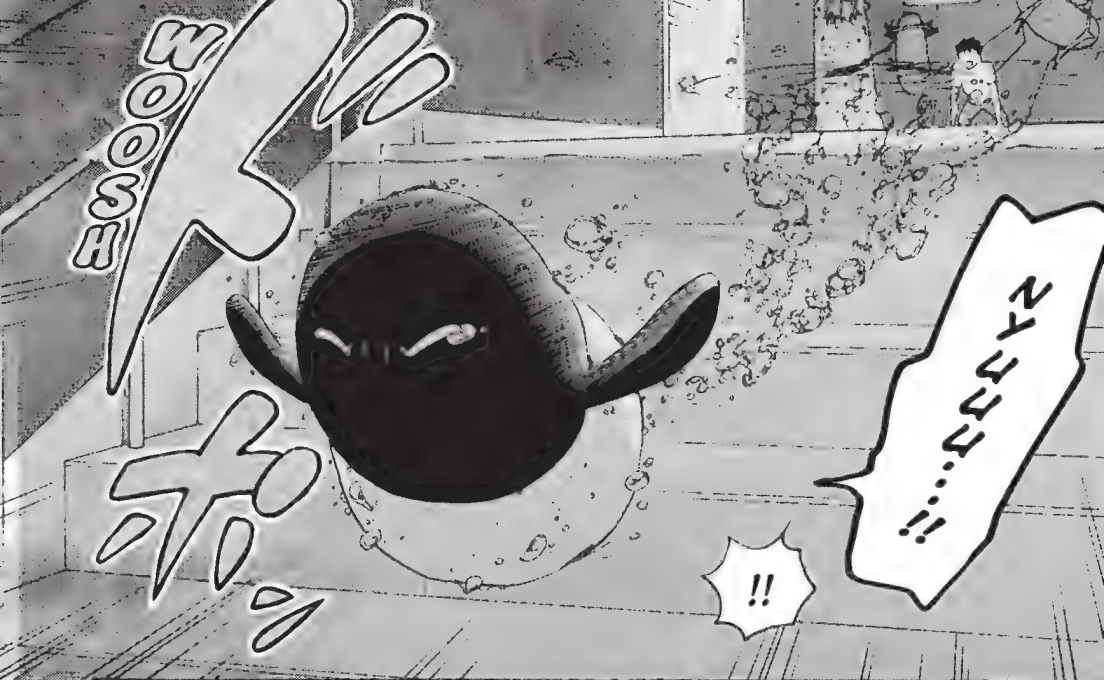


**DON'T  
WORRY  
ABOUT  
ME!**

**THINK OF  
YOURSELF  
AND RUN!!**







LACTIC ACID  
BACTERIUM....!!

HMPH.  
WHAT A  
PATHETIC  
FARCE.



BUT  
I'M  
OKAY...  
I...

I'M SORRY...  
THAT YOURS  
HAD TO BE  
SUCH A SAD  
GOOD-BYE...

I JUST  
WANT YOU  
TO LIVE...

GROW  
UP...

...TO  
BE A  
STRONG  
LACTIC  
ACID  
BACTER-  
IUM...





ARE YOU  
READY?

MAYBE...

JUST  
MAYBE...

CELL

モズ  
モズ  
モズ

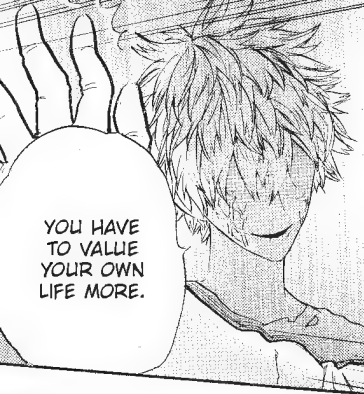


FELT  
JUST LIKE  
THIS...  
IN THE  
END...

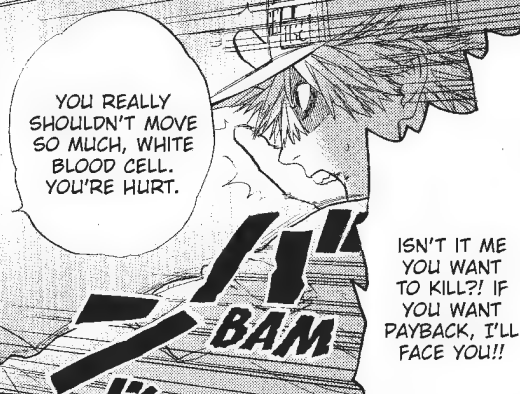
THE CELL  
THAT  
MADE ME...








YOU HAVE  
TO VALUE  
YOUR OWN  
LIFE MORE.



YOU REALLY  
SHOULDN'T MOVE  
SO MUCH, WHITE  
BLOOD CELL.  
YOU'RE HURT.


ISN'T IT ME  
YOU WANT  
TO KILL?! IF  
YOU WANT  
PAYBACK, I'LL  
FACE YOU!!

CANCER  
CELL!  
LET ME  
OUT OF  
HERE!!



...THEN I  
CAN LET YOU  
OUT RIGHT  
AWAY.

IF  
YOU CAN  
ACCEPT  
WHAT I  
HAVE TO  
TELL  
YOU...



HOW TERRIBLE  
YOU MUST  
FEEL TO BE  
TRAPPED THERE,  
POWERLESS.

...?!



PLEASE!!



I HAVE  
TO KILL  
THIS  
CANCER  
CELL!!

PLEASE,  
OPEN  
THIS  
THING!

GUH...  
MS.  
REGULATORY  
T CELL!!

### The role of a regulatory T cell

Regulatory T cells have the ability to regulate the activity of immune cells so that they do not attack self cells or cells beneficial to the body. In this case, she is trying to suppress the attacks by the immune cells because the cancer cell is a self-borne cell and not considered a foreign substance (non-self).

KILL  
HIM?

IF  
THAT'S YOUR  
INTENT, THEN  
I CAN'T LET  
YOU OUT.

HEH  
HEH  
HEH

...!!

HE IS  
NOT A  
FOREIGN  
ENEMY.

NO, YOU  
MUSTN'T  
ATTACK A  
CELL.

ISN'T IT FUNNY?  
YOU NORMAL  
CELLS ALL TAKE  
YOUR JOBS SO  
SERIOUSLY...

KLAK



CANCER  
CELL...  
I'M GOING  
TO KILL  
YOU...

IT'S NOT  
THAT SHE'S  
BETRAYING  
YOU GUYS.

THAT'S  
THE LADY'S  
JOB.





...WHITE  
BLOOD  
CELL...


...YOU  
SPARED THAT  
ORDINARY CELL  
AND THOSE  
LACTIC ACID  
BACTERIA.

AND DESPITE  
BEING SO  
SERIOUS...



IT MADE  
ME CHANGE  
MY MIND  
ABOUT SOME  
THINGS.

NGH...



BUT IT  
MADE ME  
THINK.

YOU'RE  
RIGHT.  
I KNOW  
THAT.

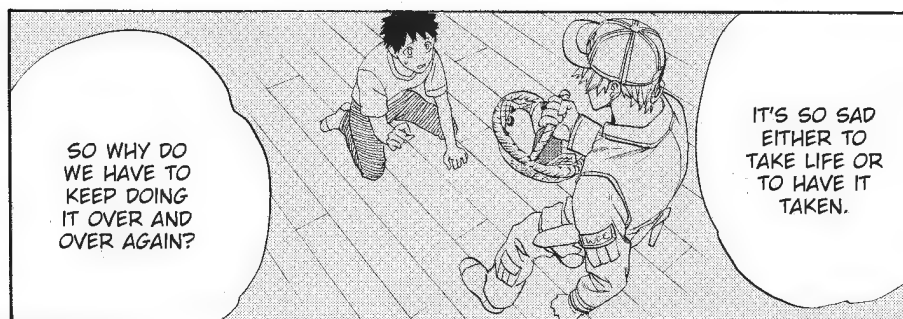
THAT WAS...  
I DIDN'T KILL  
THOSE BACTERIA  
BECAUSE THEY  
WERE BENEFICIAL  
TO THIS BODY!!



WHY DOES  
THAT  
DISTINCTION  
EXIST?

SOME  
LIVES ARE  
NECESSARY  
...

...AND  
OTHERS  
AREN'T.



SO WHY DO  
WE HAVE TO  
KEEP DOING  
IT OVER AND  
OVER AGAIN?

IT'S SO SAD  
EITHER TO  
TAKE LIFE OR  
TO HAVE IT  
TAKEN.



HA HA. I  
THOUGHT  
YOU'D SAY  
THAT.

SO LET'S  
TAKE THIS  
A LITTLE  
FURTHER.

IT'S  
FOR THIS  
BODY!! WE  
DIE AND  
WE KILL  
BECAUSE  
THAT'S  
WHAT'S  
NEEDED!!

WELL?  
HAVE  
YOU EVER  
THOUGHT  
ABOUT  
SOMETHING  
LIKE THIS?





WHAT'S MORE  
IMPORTANT...

THE LIVES  
OF TENS OF  
TRILLIONS  
OF CELLS, OR  
THE SINGLE  
LIFE OF THIS  
BODY?



I WAS  
KILLED, AND  
YOU DID THE  
KILLING...  
WE'VE ALL  
SUFFERED.

SACRIFICING  
OURSELVES  
SO THAT  
THIS BODY  
CAN KEEP ON  
LIVING.

WE CELLS HAVE  
KILLED, BEEN  
KILLED, HATED  
EACH OTHER—

...WOULDN'T IT  
BE JUSTIFIABLE  
TO SACRIFICE  
THE LIFE OF  
THIS BODY FOR  
THAT?

EVEN IF  
IT'S A MAD  
WORLD BOUND  
FOR DEATH,  
IF WE COULD  
REALIZE SUCH  
A WORLD FOR  
EVEN A  
MOMENT...

...WHERE  
WE CELLS  
DON'T HAVE  
TO KILL OR  
BE KILLED?

WHAT IF  
WE COULD  
CREATE A  
WORLD...





THIS...  
PLACE!!

RUMBLE

ゴ

ゴ

ゴ

RUMBLE

ゴ

ゴ

SQUEEZE

THEY'RE  
TOXINS FROM  
HARMFUL  
BACTERIA...!!

CRACK

CRACK

TH-THOSE  
FUMES...

RUMBLE

ゴ

ゴ

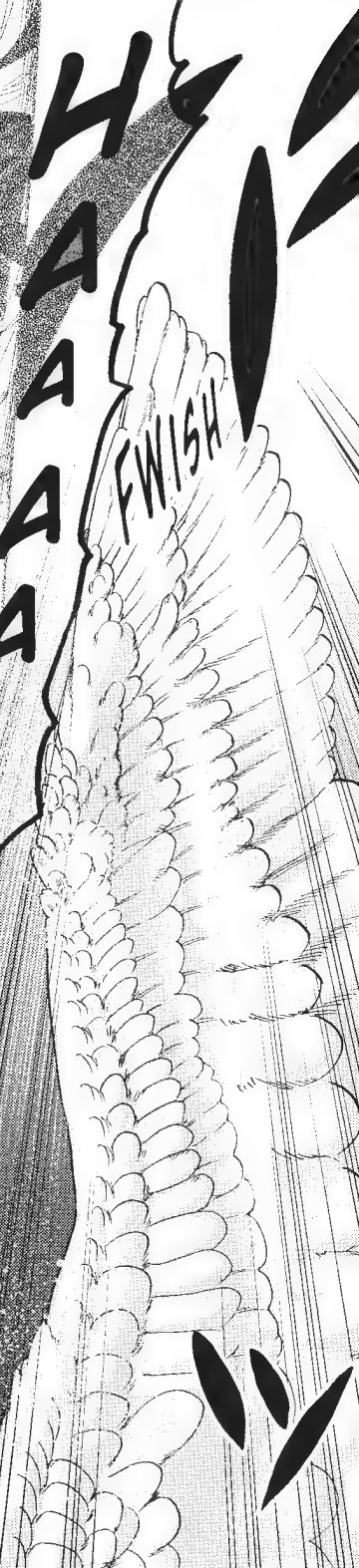
RUMBLE

RUMBLE

WHEN  
THE NEW  
WORLD IS  
FINISHED...

...CAN  
WE BE  
FRIENDS?

WHITE  
BLOOD CELL,  
MY KIND-  
HEARTED  
KILLER.







**CANCER  
CELL, DON'T  
DO THIS!!!**

**RUMBLE!!**

**RUMBLE!!**

**Cells at**  
**はたらく細胞 Work!**





### Cancer Cells

Cells that multiply uncontrollably due to a genetic anomaly. They overstep the boundaries with neighboring normal cells.

## CHAPTER 25: CANCER CELL II (PART II)



ARE YOU ALL RIGHT?!

NK!!  
MEMORY  
T!! MS.  
REGULA-  
TORY T  
CELL!!

### White Blood Cell (Neutrophil)

Destroys foreign substances that enter the body from the outside, such as bacteria and viruses.



### Memory T Cell

Some Killer T cells become Memory T cells, and prepare to attack in case the same enemy appears again.



### NK Cell (Natural Killer Cell)

Patrols the whole body and attacks cancerous and virus-infected cells on sight.



ARE  
YOU MORE  
WORRIED  
FOR YOUR  
FRIENDS THAN  
YOURSELF?



YOU CAN  
ONLY LIVE FOR  
OTHERS, BUT  
YOU WERE BORN  
A CELL WHO  
CAN ONLY KILL  
OTHERS.

I FIND YOU SO  
PITIFUL, AND  
AWKWARD, AND  
AMUSING.



WELL,  
GOOD FOR  
YOU....!!



I LIKE  
THAT  
ABOUT  
YOU.

ALONG WITH  
ALL THE  
CONTRADICTIONS  
YOU CARRY  
INSIDE.



...ALL  
OF YOUR  
MOVES,  
YOU  
LITTLE  
BRAT!!

I  
ALREADY  
KNOW...

OH?

RUMBLE  
BLE

RUMBLE  
RUMBLE

WHOA!

**Regulatory T Cell**  
She regulates the activity of  
T cells to prevent immune  
system anomalies.

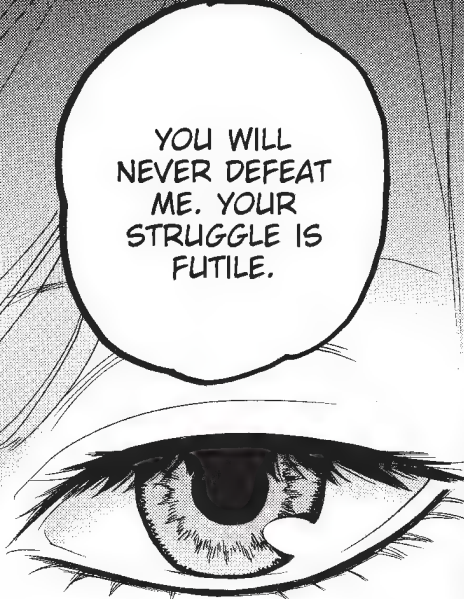


#### The role of a regulatory T cell

Regulatory T cells have the ability to regulate the activity of immune cells so that they do not attack self cells or cells beneficial to the body.








YOU WILL  
NEVER DEFEAT  
ME. YOUR  
STRUGGLE IS  
FUTILE.



CATCH

YES... YOU'VE  
ALWAYS BEEN  
THE SAME.




GUH... SQUEEZE

BAD AT  
STRATEGY...  
AND SWAYED  
BY EMOTION.



GIVE UP  
AND CEASE  
YOUR  
ATTACKS.



RUMBLE

UNABLE  
TO FEED OFF OF  
VICTORY, NOR  
TO RISE ABOVE  
DEFEAT. YOU'VE  
ALWAYS BEEN  
LIKE THAT.

NOOOOW.

WHATEVER  
SHALL WE  
DO WITH  
YOU?

LOOM

ズ

ズ

ズ

WE JUST  
CAN'T DECIDE  
WHERE TO  
START  
SLICING  
YOU.

#### Harmful Bacteria

Include pathogenic *Escherichia coli*,  
*Staphylococcus*, and *Clostridium*.  
They break down proteins and  
make harmful byproduct.

WOOOOW!

#### Opportunistic Bacteria

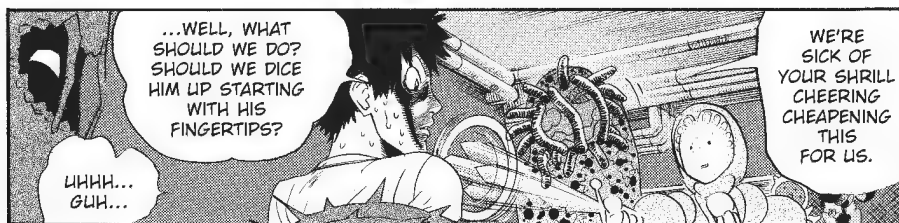
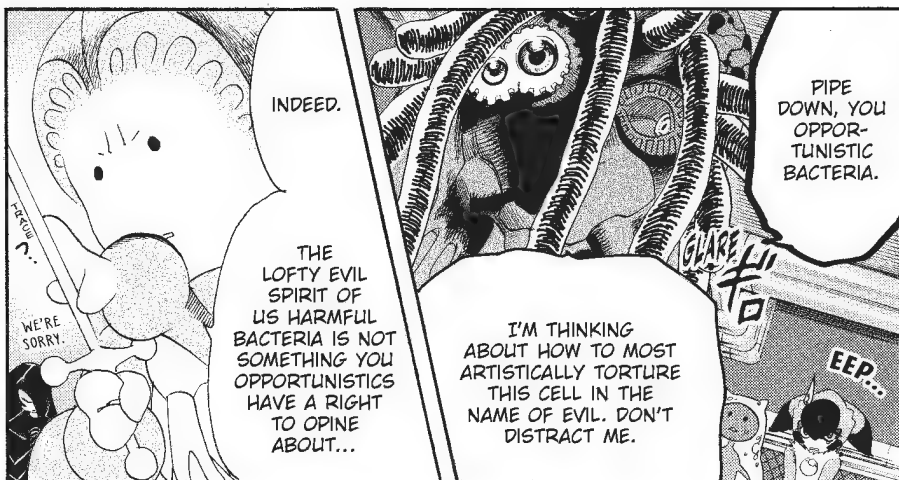
Include *Bacteroides*, nonpathogenic  
*Escherichia coli*, and *Eubacterium*. Neither  
helping nor harming the body, they make up  
roughly 70% of the bacteria in the intestines.

HOW ABOUT  
YOU USE YOUR  
TENTACLES  
TO SLAM HIM  
AGAINST THE  
WALL?!

WOOOW!♡  
YOU HARMFUL  
BACTERIA ARE  
PROS OF EVIL  
ENTERTAIN-  
MENT!♡

I'M SO  
IMPRESSED!!  
TO LET HIM  
KNOW EXACTLY  
WHAT YOU'RE  
GOING TO DO  
TO HIM—  
HOW TERRIBLY  
CRUEL  
OF YOU!!





GAAAUGH!!!

スッパッ

SPLASH

STEP 7.

SORRY TO KEEP YOU WAITING, CELL BOY!!

STEP 7.

SORRY TO KEEP YOU WAITING, CELL BOY!!







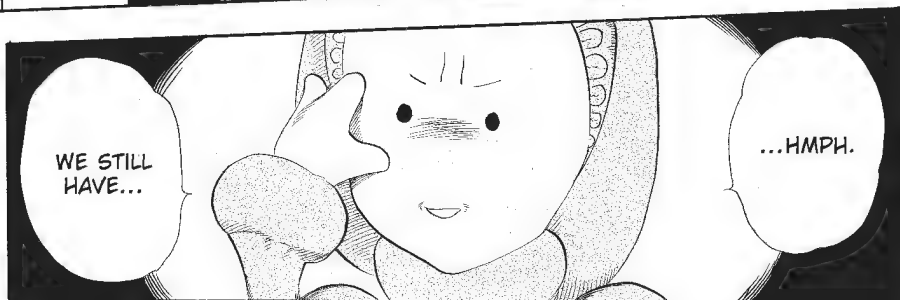
YOU'VE GOT  
SOME NERVE  
CAUSING  
TROUBLE IN  
THE BIGGEST  
IMMUNE  
TISSUE IN THE  
BODY!!

TIME  
FOR YOUR  
PUNISHMENT,  
GERMS!!



QUIT YOUR  
UNSEEMLY  
WAILING!

WHAT DO  
WE DO,  
MR.  
HARMFUL?



WE STILL  
HAVE...

...HMPH.



...THE  
ADVANTAGE IN  
NUMBERS.



YOU SHOULD  
BE ASHAMED...  
ALLOWING  
YOURSELVES TO  
DISPLAY SUCH  
FOOLISH CONFIDENCE  
IN AN ENVIRONMENT  
WHERE WE HARMFUL  
BACTERIA HOLD THE  
UPPER HAND.

THIS  
OVERWHELMING  
HORDE OF  
OPPORTUNISTIC  
BACTERIA ARE  
ON MY SIDE.



WHAT?!  
THERE'S  
SO MANY  
MORE OF  
THEM!!

EEP...



**7"  
BOOM**

**VICTORY ACHIEVED WITH NUMBERS IS THE HIGHEST AESTHETIC FOR US BACTERIA!! BWAA HA HA!**

**NUMBERS!! THAT'S POWER!!**

**7"  
BOOM**

**VICTORY ACHIEVED WITH NUMBERS IS THE HIGHEST AESTHETIC FOR US BACTERIA!! BWAA HA HA!**

**NUMBERS!! THAT'S POWER!!**

HA... HA...

BOOM

BOOM

HA...



HUUUUH?!

BOMPF

BOMPF

BOMPF

BOMPF

BOMPF

RUMBLE

### Good Bacteria

Include lactic acid bacteria, *L. gasseri* and *Bifidobacterium*. They can help strengthen immune response and promote intestinal activity. They act in ways that are beneficial to the human body.



NYU

BOMPF

WAH!  
BOMPF

EKK!

BOMPF

WHACK

WHACK

WHACK

WHACK

WHACK

WHACK

A-ARE  
THESE  
GOOD  
BACTERIA?!



OPPOR-  
TUNISTIC  
BACTERIA...  
WHAT ARE  
YOU DOING?!  
GET RID OF  
THEM...!

GUUGH...  
IT ONLY TOOK  
THIS MANY GOOD  
BACTERIA TO  
COMPLETELY  
FLIP THE  
SITUATION?

**Characteristic of  
Opportunistic Bacteria**  
They side with good or  
harmful bacteria, depending  
on who holds the advantage.

THAT'S RIGHT!  
COULDN'T YOU  
JUST TAKE A  
COMPLIMENT INSTEAD  
OF BLABBERING ON  
ABOUT ART? HOW  
HIGH-MAINTENANCE  
ARE YOU?

EEP!

IT'S THE  
AGE OF GOOD  
BACTERIA NOW!!  
IT'S TIME FOR  
US TO JOIN  
THE RANKS OF  
BEAUTIFUL,  
UPSTANDING  
CITIZEN  
BACTERIA!!

QUIT YOUR  
YAPPING!!  
THE TIMES  
HAVE  
CHANGED!!

BOOM

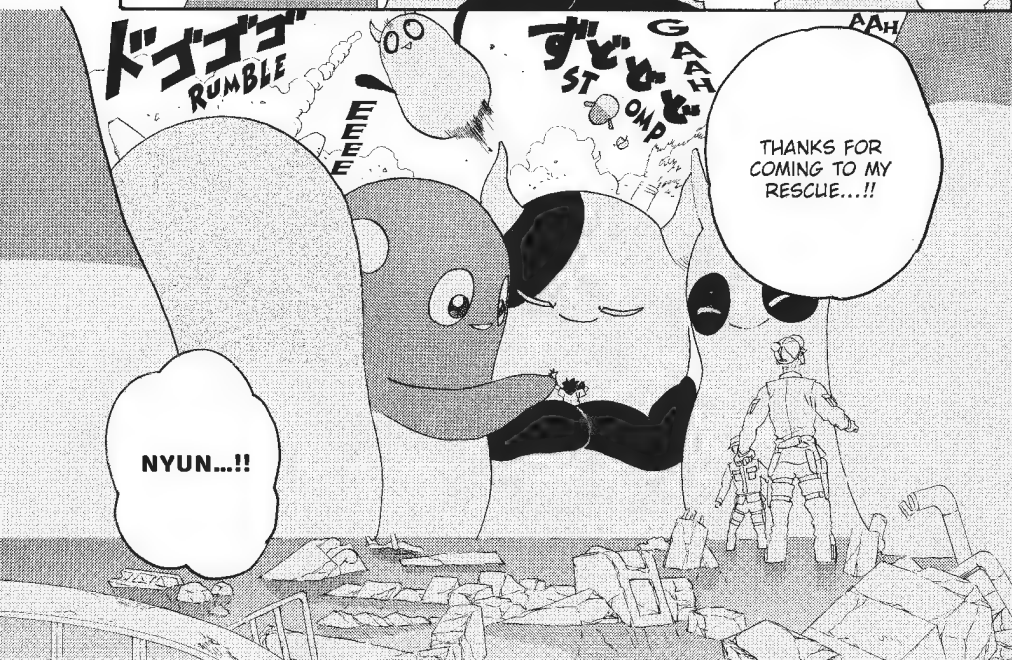
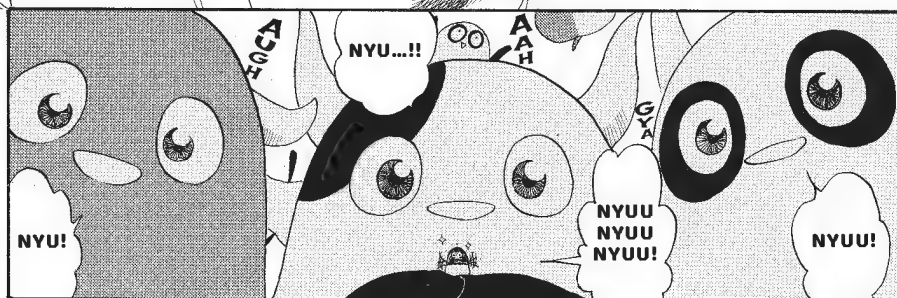
どん

WE'RE GONNA  
KILL YOU,  
OBVIOUSLY.

LET'S ALL BE  
FRIENDS NOW,  
EVERYONE.♡

WAG  
ぱた  
ぱた  
WAG







I WON'T  
KILL  
THEM  
YET.

DON'T  
WORRY.



MEMORY  
T!! NK!!



CANCER  
CELL,  
STOP IT!

GAAH!



NO.

I DON'T  
WANT TO  
KILL A  
FRIEND.

YOU'RE  
JUST LIKE ME,  
STRUGGLING  
WITHIN A FATE  
THAT WAS  
DECIDED FOR  
YOU!

BECAUSE I  
LIKE YOUR  
CONTRADICTIONS.



WHY?! WHY  
WON'T YOU  
FIGHT ME?!

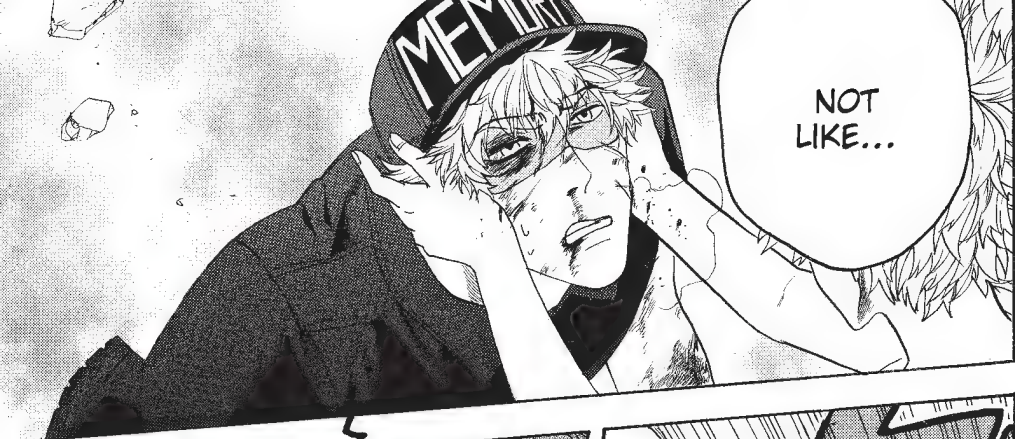
FIGHT  
ME!!



GAH...  
AH...

CRUMBLE  
CRUMBLE





ゴ "ゴ" ゴ "ゴ" ゴ "ゴ"

RUMBLE RUMBLE RUMBLE

I HATE  
MEMORY T'S  
AND NK'S  
GUTS. I WANT  
TO SMASH  
EVERYTHING  
THAT'S DEAR  
TO THEM.

CELL

I LIKE WHITE  
BLOOD CELL!  
THERE'S SO  
MUCH I WANT  
TO TALK WITH  
HIM ABOUT.

ゴ "ゴ" ゴ "ゴ" ゴ "ゴ"

RUMBLE RUMBLE RUMBLE

I HATE  
MEMORY T'S  
AND NK'S  
GUTS. I WANT  
TO SMASH  
EVERYTHING  
THAT'S DEAR  
TO THEM.

CELL

I LIKE WHITE  
BLOOD CELL!  
THERE'S SO  
MUCH I WANT  
TO TALK WITH  
HIM ABOUT.

I THINK I CAN GAIN THE **POWER** EARLIER THAN I THOUGHT.

RUMBLE  
RUMBLE  
RUMBLE  
RUMBLE  
BOOM

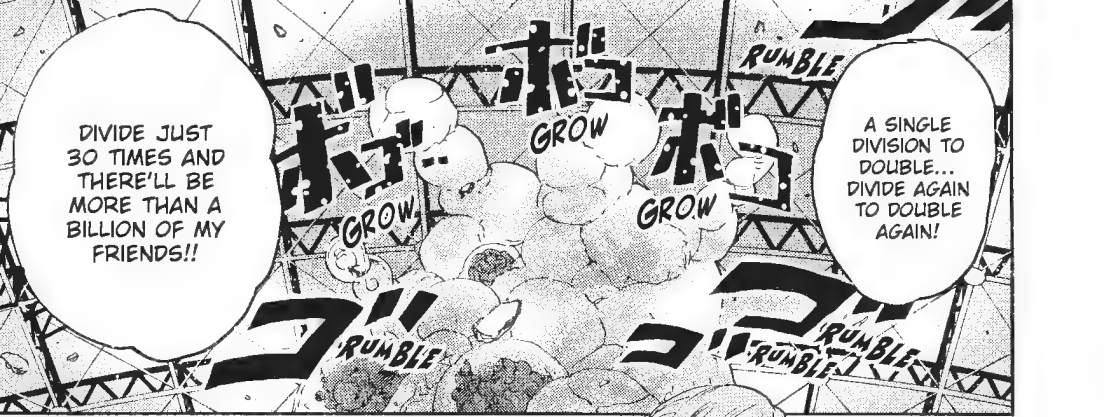
THOSE EMOTIONS ARE GIVING ME STRENGTH.

I THINK I CAN GAIN THE **POWER** EARLIER THAN I THOUGHT.

RUMBLE RUMBLE RUMBLE RUMBLE RUMBLE

THOSE EMOTIONS ARE GIVING ME STRENGTH.





DIVIDE JUST  
30 TIMES AND  
THERE'LL BE  
MORE THAN A  
BILLION OF MY  
FRIENDS!!

A SINGLE  
DIVISION TO  
DOUBLE...  
DIVIDE AGAIN  
TO DOUBLE  
AGAIN!



...IF YOU  
THINK YOU  
CAN STOP  
ME, GO  
AHEAD AND  
TRY.

ALL RIGHT,  
YOU HARD-  
WORKING  
IMMUNE  
CELLS...







BACK IN THYMUS SCHOOL

THYMUS

CAMPUS

UNIVERSITY

HEY MAN,  
YOU'RE  
SOMETHING  
ELSE.

I JUST  
GOT  
LUCKY  
THAT  
TIME.

BUT  
I'LL  
WORK  
HARD  
AND  
BUILD  
UP  
THE  
SKILLS  
I  
NEED...

A CELL OF YOUR  
TALENTS MIGHT  
BE ABLE TO  
MASTER THE  
ULTIMATE SECRET  
TECHNIQUE!

### Thymus

A lymphoid organ that differentiates and matures precursor T cells into full-fledged T cells.

UOL  
TWITCH

ULTIMATE...  
SECRET  
TECHNIQUE?

IT'S SO AMAZING  
AND POWERFUL  
THAT THE TARGET  
IS BLOWN AWAY  
AS IF STRUCK BY  
A GIANT FIST.

IT'S CALLED  
T-CELL  
PERFORIN  
CANNON  
PUNCH!!

IT'S A LEGENDARY  
MOVE THAT CAN  
ONLY BE UNLEASHED  
WHEN A T CELL'S  
DESIRE TO PROTECT  
THE BODY IS  
HEIGHTENED TO ITS  
LIMITS.

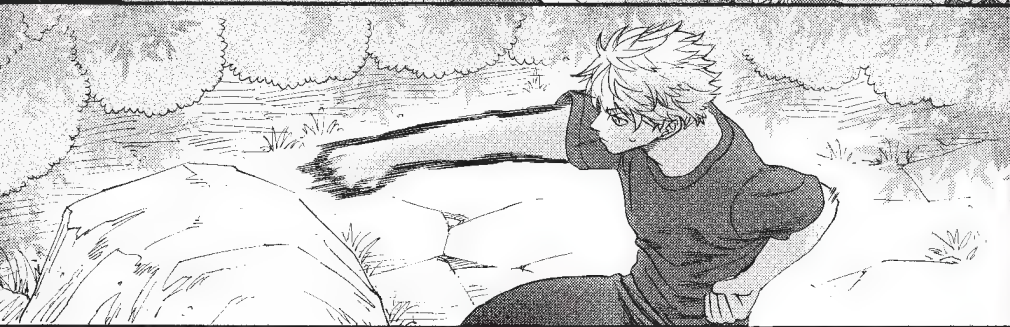
### Perforin

A chemical released by Killer T cells when they attack infected cells.

DESIRE...  
GIANT  
FIST...?

ULTIMATE  
SECRET  
TECHNIQUE...







I'M  
DONE  
LETTING  
YOU  
HAVE  
YOUR  
WAY!

MEMORY

MEMOR

TAKE THIS!  
T CELL  
PERFORIN  
CANNON  
PUNCH!!











I  
REALLY...  
DID IT...



WHAT  
HAPPENED  
TO SUP-  
PRESSING  
THEIR  
ATTACKS  
AGAINST  
ME?!  
WHY DID  
YOU JUST  
DODGE?!

MS.  
REGULATORY—  
MS.  
REGULATORY  
T CELL?!

HACK HACK!  
WH-WH-WH-WH-  
WHAT...WAS THAT  
WEIRD MOVE?

I  
SEEM  
TO...

...HAVE  
MADE AN  
ERROR OF  
JUDGMENT.

...?!

UPON  
CLOSER  
INSPEC-  
TION...  
...YOU  
ARE...

YOU WERE  
NOT A  
CELL TO BE  
PROTECTED.

トビ  
TWITCH

REALLY!!!

BOOM

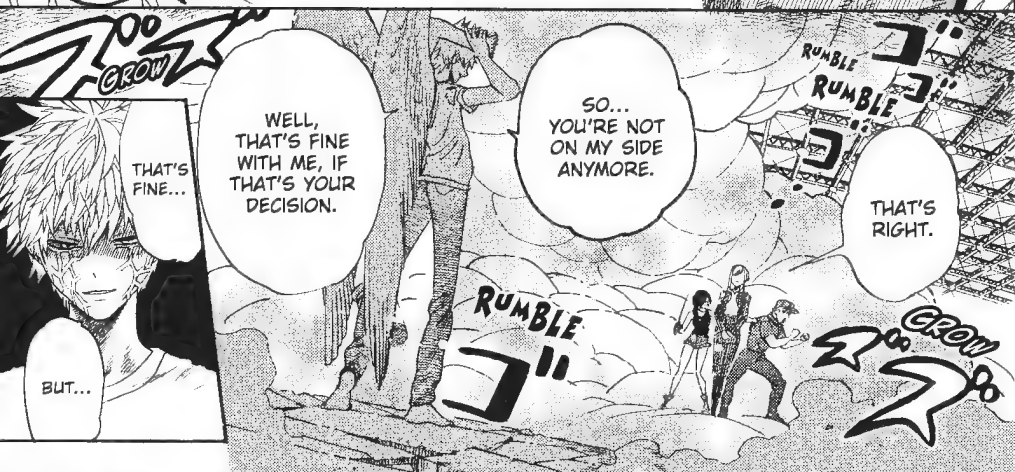
YOU  
TURNED  
OUT NOT  
TO BE A  
CELL,  
BUT A  
"CEL"...





...I'M A  
"CEL," NOT  
A "CELL,"  
HUH? HOW  
'BOUT  
THAT.

YOU WON'T  
PROTECT ME  
BECAUSE...



THAT'S  
FINE...

WELL,  
THAT'S FINE  
WITH ME, IF  
THAT'S YOUR  
DECISION.

SO...  
YOU'RE NOT  
ON MY SIDE  
ANYMORE.

THAT'S  
RIGHT.

BUT...



I'LL NEED  
YOU TO  
STAY OUT OF  
MY WAY.



SLASH

LIKE I SAID...

...I KNOW ALL YOUR MOVES ALREADY.



NAILED IT!



...CUTTING ME DOESN'T DO ANYTHING.

AND LIKE I SAID...

CRUMBLE

SNAP

SNAP

SNAP

SNAP

SNAP





**IT LOOKS LIKE WITH THE SHIFT IN THE INTESTINAL ENVIRONMENT, THERE'S LESS OF THE TOXINS FROM THE BAD BACTERIA THAT WERE GIVING YOU STRENGTH.**



WHEEZE

**I CAN'T  
MAINTAIN MY  
STRENGTH?!**

FL: L

I CAN'T  
CONCEN-  
TRATE MY  
POWER?!  
WHY...?!

!!

W-  
WHY...?

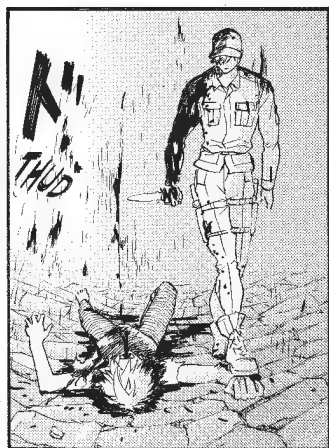


SLASH

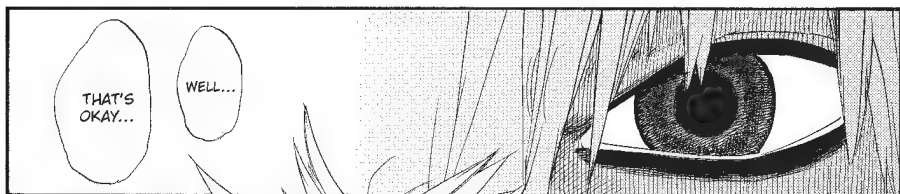
WHITE  
BLOOD  
C-











...MY KIND-  
HEARTED  
KILLER.

SEE YOU  
AGAIN...  
WHITE  
BLOOD  
CELL...



OH-HUH.

I REALLY  
DID IT...

CANCER  
CELL HAS  
BEEN  
DEFEATED!!

THE  
CRISIS  
IS  
OVER!!





#### Role of lactic acid bacteria

Some lactic acid bacteria are thought to interact directly with the intestinal wall to help maintain the functions of the intestinal barrier.





**Intestinal flora (intestinal microbiota)**

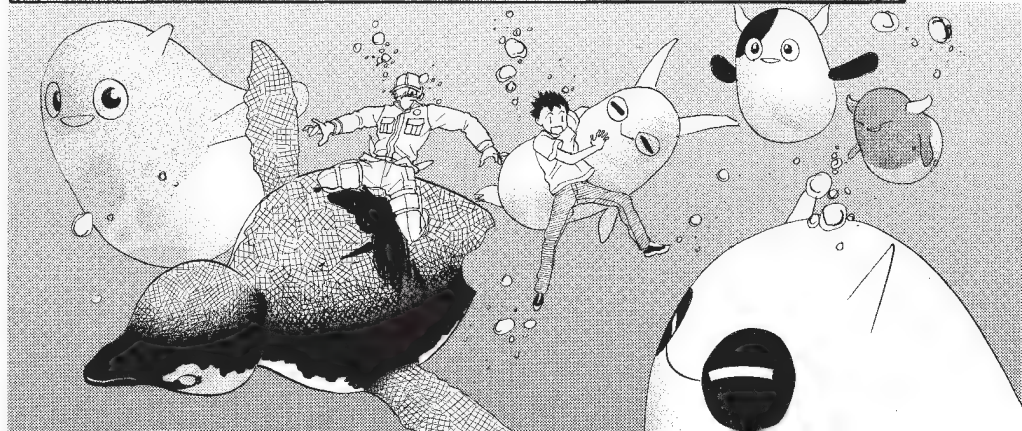
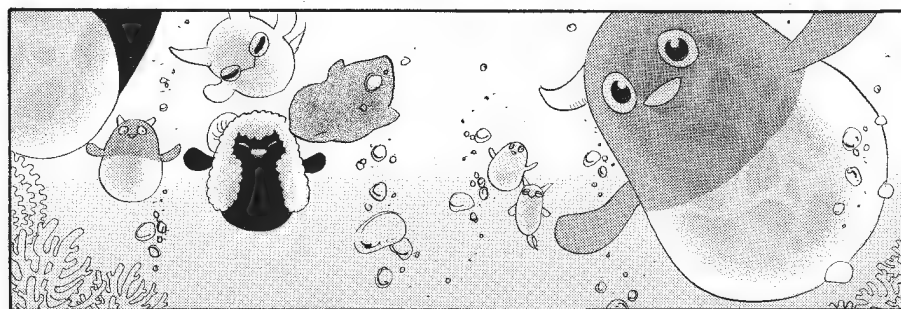
In the intestines, there are good, harmful, and opportunistic bacteria, numbering a hundred trillion with hundreds of types.





THIS IS  
THE WORLD  
WHERE YOU  
LIVE....!!

I SEE  
NOW...  
THIS...







...YUP.

WE GOT  
SOAKED.

GOOD-  
BYE...

...LACTIC  
ACID  
BACTERIA.







**T CELL  
ULTIMATE  
SECRET  
TECHNIQUE:  
PERFORIN  
CANNON  
PUNCH  
!!!**

NOW, LOOK  
CAREFULLY,  
NAIVE T  
CELLS!! JUST  
THEN, MY FIST  
WENT LIKE  
THIS—

**WHOOSH**

JUST  
LOOKS LIKE  
A NORMAL  
PUNCH TO  
ME...

YUP...



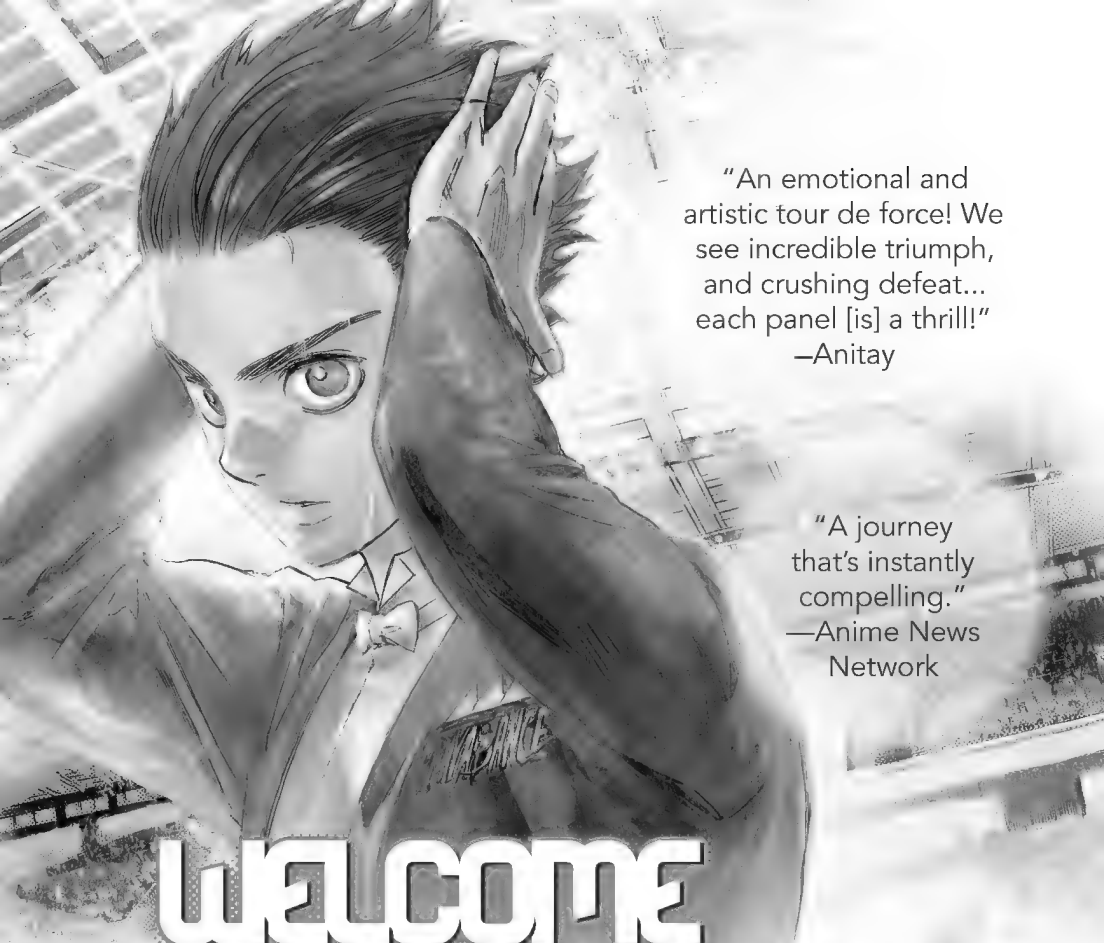
**CELLS AT WORK! VOLUME 5: END**

Medical Editor: Tomoyuki Harada

**Cells at**  
**Work!**  
はたらく細胞







"An emotional and artistic tour de force! We see incredible triumph, and crushing defeat... each panel [is] a thrill!"

—Anitay

"A journey that's instantly compelling."

—Anime News Network

# WELCOME TO THE BALLROOM

By Tomo Takeuchi

Feckless high school student Tatara Fujita wants to be good at something—anything. Unfortunately, he's about as average as a slouchy teen can be. The local bullies know this, and make it a habit to hit him up for cash, but all that changes when the debonair Kaname Sengoku sends them packing. Sengoku's not the neighborhood watch, though. He's a professional ballroom dancer. And once Tatara Fujita gets pulled into the world of ballroom, his life will never be the same.







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*New action series from Hiroyuki Takei, creator of  
the classic shonen franchise Shaman King!*

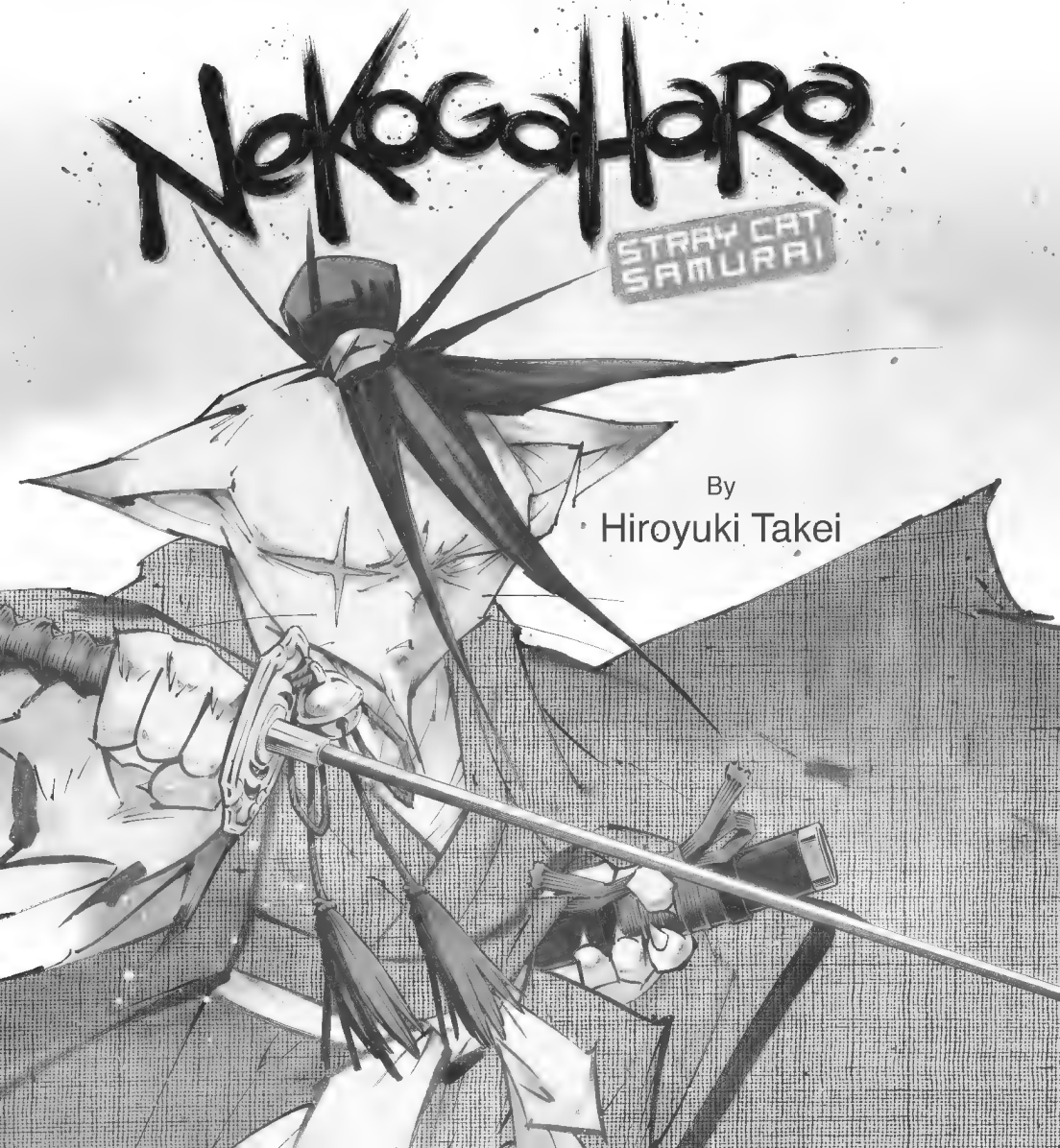
In medieval Japan, a bell hanging on the collar is a sign that a cat has a master. Norachiyo's bell hangs from his katana sheath, but he is nonetheless a stray — a ronin. This one-eyed cat samurai travels across a dishonest world, cutting through pretense and deception with his blade.

# NekoGallaro

STRAY CAT  
SAMURAI

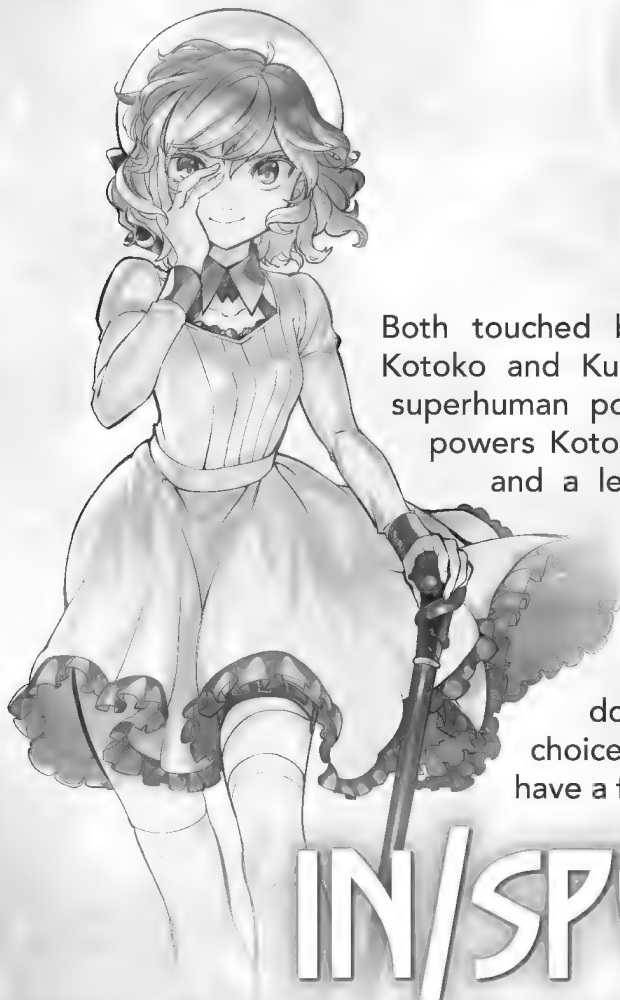
By

Hiroyuki Takei



Japan's most  
powerful spirit  
medium delves  
into the ghost  
world's greatest  
mysteries!

Story by Kyo  
Shirodaira, famed  
author of mystery  
fiction and creator of  
*Spiral*, *Blast of Tempest*,  
and *The Record of a  
Fallen Vampire*.



Both touched by spirits called yōkai, Kotoko and Kurō have gained unique superhuman powers. But to gain her powers Kotoko has given up an eye and a leg, and Kurō's personal life is in shambles. So when Kotoko suggests they team up to deal with renegades from the spirit world, Kurō doesn't have many other choices, but Kotoko might just have a few ulterior motives...

# IN/SPECTRE

**STORY BY KYO SHIRODAIRA**  
**ART BY CHASHIBA KATASE**

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# H A P P I N E S S

——ハピネス——

By Shuzo Oshimi

## From the creator of *The Flowers of Evil*

Nothing interesting is happening in Makoto Ozaki's first year of high school. His life is a series of quiet humiliations: low-grade bullies, unreliable friends, and the constant frustration of his adolescent lust. But one night, a pale, thin girl knocks him to the ground in an alley and offers him a choice. Now everything is different. Daylight is searingly bright. Food tastes awful. And worse than anything is the terrible, consuming thirst...

## Praise for Shuzo Oshimi's *The Flowers of Evil*

"A shockingly readable story that vividly—one might even say queasily—evokes the fear and confusion of discovering one's own sexuality. Recommended." —The Manga Critic

"A page-turning tale of sordid middle school blackmail." —Otaku USA Magazine

"A stunning new horror manga." —Third Eye Comics



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COMICS

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# The Black Museum <sup>The</sup> Ghost and the Lady

By Kazuhiro Fujita

Deep in Scotland Yard in London sits an evidence room dedicated to the greatest mysteries of British history. In this “Black Museum” sits a misshapen hunk of lead—two bullets fused together—the key to a wartime encounter between Florence Nightingale, the mother of modern nursing, and a supernatural Man in Grey. This story is unknown to most scholars of history, but a special guest of the museum will tell the tale of The Ghost and the Lady...

**Praise for Kazuhiro Fujita’s *Ushio and Tora***

“A charming revival that combines a classic look with modern depth and pacing... **Essential viewing both for curmudgeons and new fans alike.**” — Anime News Network

“**GREAT!** The first episode of *Ushio and Tora* captures the essence of '90s anime.” — IGN

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A new series from the creator of *Soul Eater*, the megahit manga and anime seen on Toonami!

"Fun and lively...  
a great start!"

-Adventures in  
Poor Taste

# FIRE FORCE

By Atsushi Ohkubo

The city of Tokyo is plagued by a deadly phenomenon: spontaneous human combustion! Luckily, a special team is there to quench the inferno: The Fire Force! The fire soldiers at Special Fire Cathedral 8 are about to get a unique addition. Enter Shinra, a boy who possesses the power to run at the speed of a rocket, leaving behind the famous "devil's footprints" (and destroying his shoes in the process). Can Shinra and his colleagues discover the source of this strange epidemic before the city burns to ashes?

## **Cells at Work! 5**

KODANSHA COMICS Digital Edition

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